

EDUCATION AND RELIGION

by

Edward L. Glaeser

Harvard University and NBER

and

Bruce I. Sacerdote¹

Dartmouth College and NBER

February 14, 2002

Abstract

In the United States, religious attendance rises sharply with education across individuals, but religious attendance declines sharply with education across denominations. This puzzle is explained if education both increases the returns to social connection and reduces the extent of religious belief, and if beliefs are closely linked to denominations. The positive effect of education on social connection is the result of both treatment and selection: schooling creates social skills and people who are good at sitting still. And, people who are innately better at listening have lower costs of both school and social activities, such as church. The negative effect of education on religious belief occurs because secular education emphasizes secular beliefs that are at odds with many traditional religious views.

¹ Glaeser and Sacerdote both thank the National Science Foundation for financial support. Gary Becker, Edward Lazear, David Laibson, N. Gregory Mankiw, Nancy A. Schwartz, Lawrence Summers, Steven Tadelis, and Andrei Shleifer provided helpful discussions. Jesse Shapiro gave us his usual superb research assistance.

I. Introduction

In the United States, church attendance rises with education.² Fifty percent of college graduates born after 1945 attend church more than “several times per year.”³ Only thirty six percent of high school dropouts, born during the same period, attend church that often. Figure 1 shows the mean attendance level by level of education. In a univariate regression, a one-standard deviation increase in schooling raises church attendance by .12 standard deviations (see Table 1). When we control for other factors, the relationship between education and religious attendance gets stronger. In many multivariate regressions, education is the most statistically important factor explaining church attendance.

But across religious groups or denominations, church attendance declines with education. In the most educated Christian denomination, Episcopalianism, the median person attends church “several times per year.” In the least educated major denomination, the Baptist groups, the median person attends church once per month. In the General Social Survey, members of the group with the least education, “other denomination Protestants”, have the most religious attendance.⁴ Figure 2 shows the negative .86 percent correlation between average education and average religious attendance across denominations. The goal of this paper is to understand why the denomination-level connection between education and religion has the opposite sign of the individual-level connection between these variables.

A switch in the sign of a coefficient between individual-level and group-level regressions occurs when there is omitted factor that differs across groups. If this omitted factor has the same positive impact on the outcome as the main explanatory variable, then this omitted factor must be negatively correlated with the explanatory variable. Furthermore, as we show in Section III, the key condition for a micro-macro coefficient switch is that the impact of the omitted factor on the outcome *times* the degree to which there is sorting across groups on the basis of this omitted factor must be greater than the impact of the explanatory variable on the outcome *times* the degree to which there is sorting across groups on the basis of the explanatory variable. Thus,

² Iannaccone (1998) provides an excellent introduction to the economics of religion, and shows this fact in Table 1 of his paper.

³ Our primary evidence on religious attendance is the General Social Survey, where respondents describe their attendance by putting their attendance in categories such as attending several times per year. Mean attendance levels are calculated by averaging categorical variables as explained in the data description section.

⁴ This group includes Protestants who are not members of a major denomination such as Mormons, Pentacostalists and Jehovah’s Witnesses.

micro-macro sign switches can occur when there is an omitted factor that is negatively correlated with the explanatory variable and when the omitted factor is particularly important in determining the outcome or particularly important in determining sorting across groups.

In the context of religion and education, the most natural omitted factor is the degree of religious belief, i.e. the extent to which individuals believe that there are returns to religious activity.⁵ Measures of religious belief are strongly correlated with religious attendance and negatively associated with education. Less educated people are more likely to believe in miracles, heaven, devils, and the literal truth of the Bible. Furthermore, denominations are, to a significant extent, defined by their beliefs, and unsurprisingly sorting across denominations on the basis of religious beliefs is stronger than sorting across denominations on the basis of education. As such, religious belief is a natural omitted factor that is negatively correlated with education, positively correlated with attendance and very important for sorting across denominations.

In this paper, we craft a simple statistical model of religious attendance, education and belief and then we estimate that model. We then try to explain why education increases church attendance and decreases the extent of religious belief. We present evidence supporting the idea that the positive relationship between education and attendance is the result of omitted factors (such as interests and social skills), which relate both to church-going and school attendance. Both activities require sitting still, listening, being interested in abstract ideas and putting future gains ahead of current gratification. We show the connection between education and a wide range of formal social activities that require similar skills and interests as church-going. Church attendance is formal social activity, and since education is correlated with every other such activity, we shouldn't be surprised that education positively predicts church attendance.

The negative relationship between religious beliefs and education occurs because the content of secular education and religion often oppose one another. Modern education tends to emphasize secular humanism not faith. Many pioneers of social science thought that science disproved religion and that knowledge dispels religious belief.⁶ Since these social scientists influenced secular education significantly, their views inevitably had weight. In the 19th century, public

⁵ Azzi and Ehrenberg (1975) began the modern economics literature on religion with the view that beliefs about the hereafter drive religious attendance.

⁶ Marx, Weber, Freud and particularly Comte all held to variants of this view. Frank Knight is perhaps the economist who was most famously hostile to religion. Interestingly, Stark, Iannacone and Fink, (1996) find that hard scientists are more likely to be religious than social scientists. These authors are extremely critical of the idea that knowledge eliminates religion. Of course, formal schooling and knowledge are not the same thing.

education in the U.S. and elsewhere was designed, in part, to replace Catholic religious beliefs with a secular, nationalist belief system. In our data, there does appear to be something of a treatment effect where education reduces religious beliefs. The causality seems to go in both directions as many Christian ideas explicitly downplay the value of secular success, and as a result people who come from higher belief denominations invest less in secular education.

The facts in this paper highlight two important aspects of religion and two important aspects of education. Religion provides spiritual returns and more earthly social returns. The very distinct nature of these two aspects of religion can create oddities like the micro-macro switch in the education religion relationship. Education is linked both to the formation of ideological beliefs and to social involvement (Putnam, 2000). As Bowles and Gintis (1976) and Lott (1990) emphasize, ideological correlates of education are ubiquitous and include attitudes towards race (more educated people are less discriminatory), international politics and God. The fact that education both changes beliefs and is correlated with more sociability can lead more educated people to attend church more often and to believe less in the things preached from the pulpit.

In Section II of this paper we document our basic facts about the connection between education and religious attendance. In Section III, we sketch a statistical framework to understand when individual-level relationships and group-level relationships have different signs and can coexist with a negative denomination-level education-religion relationship. Section IV presents evidence that secular education and religious beliefs are substitutes. In Section V, we look at the extent of sorting across denomination by education and beliefs. In Section VI, we examine the impact of education and beliefs on attendance and try to explain why there is a positive effect of education on attendance. Finally, in Section VII, we present an economic model that fits with our interpretations and that rationalizes the statistical model in Section III. Section VIII concludes.

II. General Facts about Education and Religion

In this section, we document the positive relationship between education and church attendance across people and the negative relationship across denominations.

Data Description: The General Social Survey 1972-1998 (GSS) provides the largest sample size and richest set of covariates of any U.S. data set with questions on religious beliefs and

attendance. Every two years, the GSS surveys approximately 1500 randomly selected people in metropolitan and rural areas across the U.S.. Appendix I gives a detailed description of the data. We also use international data from the World Values Survey which has smaller data samples for 69 countries.

In addition to asking questions about religious and other beliefs, the GSS also collects standard demographic information about the respondent, the respondent's other family members, the respondent's parents, and some historical information about the individual himself. For both current and past religious affiliations, respondents are asked first to characterize their religious affiliation as Jewish, Catholic, Protestant, other religion, or no religion. Respondents who answer Protestant are then asked to identify their denomination from the following list: Episcopal, Methodist, Lutheran, Presbyterian, Baptist, other denomination, or no denomination.⁷

Our outcome variables include religious attendance, prayer, membership in church and non-church organizations, and belief in the following concepts: miracles, heaven, the Devil, and the literal truth of the Bible. We use years of schooling to measure the respondent's education. Our variable for religious attendance originally took on values from zero to eight. The eight categories are never attending, attending less than once per year, attending about once or twice per year, attending several times per year, attending about once per month, attending two to three times, attending nearly every week, attending every week, and attending several times per week. We standardize education and attendance in both the GSS and the World Values Survey so that they are mean zero, variance one within the relevant sample.

Education and Religion across People: The basic relationship between education and religious attendance is documented in Table 1. As mentioned earlier, both education and attendance are presented as standardized variables with a mean of zero and variance of one. In the first regression, we show the simplest univariate relationship between education and religion. Because there are significant relationships between cohort and both age and attendance (people from older cohorts attend church less and have less education), we restrict ourselves to people born after 1945 to minimize cohort effects.⁸ We find similar results for older cohorts. In

⁷No further information is available about respondents who list other religion or other denomination Protestant as their affiliation.

⁸Greeley (1989) finds little secular trend in religious adherence. However, we do find substantial cohort effects in the General Social Survey, especially once we control for age.

regression (1), a one standard deviation increase in education raises religious attendance by .12 standard deviations. The t-statistic on this relationship is 15— it is statistically a very strong relationship with a reasonably large magnitude.

To check for possible non-linearities in this relationship, Figure 1 shows the average value of our normalized religion variable for different education levels (again only for people after 1945). Religious attendance among people with 16 years of schooling is .5 standard deviations higher than religious attendance among individuals with ten years of education. The relationship seems quite linear and strong until we look at people with more than 16 years of schooling where attendance declines somewhat with education.

In the second regression, we include denomination dummies, and examine the extent to which attendance rises with education within denominations. The coefficient on education rises: a one standard deviation increase in education is now associated with a .16 standard deviation rise in religious attendance (the t-statistic on this coefficient is now 20). The coefficients on the denomination dummies are quite strong.

In the third regression, we include other demographic controls, and in the fourth regression we show results for our entire sample. The estimated coefficients on the controls correspond with earlier work in this area. There is a weak positive relationship between attendance and income. Older people are more likely to attend church (as in Azzi and Ehrenberg, 1975). Blacks and women have much higher attendance levels. Married people are more likely to attend, especially if they have children. Across regions, attendance is highest in the south and lowest in the west. There is a negative relationship between city-size and attendance. The education coefficient is quite constant through these different specifications. In regression (3) the coefficient is .189 and in regression (4) the coefficient is .152.⁹

In Table 2, we look at these relationships across a broader set of countries using the World Values Survey.¹⁰ In many places, the relationship continues to be positive. For example, the positive relationship seen in the U.S. also exists in Great Britain, Spain, Sweden and France. But in many countries, the relationship is negative. In Poland, Ukraine, Russia, and Romania, the

⁹ When we look at individual denominations, we find strong positive coefficients in almost all of the denominations except for Presbyterians, Episcopalians and Jews, which are the highest education denominations.

¹⁰ Smith, Sawkins and Seaman (1998) also present results on religious attendance using the ISSP, another international data set.

relationship is robustly negative. In many countries the relationship is not statistically significant. We will try to explain these puzzling cross-country differences later in the paper.

Education and Religion across Denominations: While the positive relationship between education and attendance at the individual level within the U.S. is quite strong, the negative relationship between education and attendance at the denomination level is also impressive as seen in Tables 3 and Figure 2. We measure attendance with the denomination specific fixed effects from Table 1; our results would be quite similar if we just used the mean attendance level. Table 3 shows the differences across denominations. There is a -86 percent correlation across denominations between average education and average attendance. In a regression format the relationship across denominations is (among people born since 1945):

$$(1) \text{ Attendance} = .002 - .505 * \text{education}, \quad N=10, \text{ R-Squared}=.64 \\ (.055) \quad (.135)$$

Standard errors are in parentheses.

The lowest education denomination is the Baptists who have the second highest attendance level, measured either as a group average or as the denomination fixed effect. The second lowest education group is the Other Denomination Protestants. This is a heterogeneous, fast growing group, which includes fundamentalist groups and Mormons. Other Denomination Protestants have a much higher level of attendance than any group. Among Christian denominations, Presbyterians and Episcopalians have the highest education levels and the lowest attendance (looking at fixed effects). Jews are by far the most educated and by far the least likely to attend services. Within Judaism, the two more educated groups (reform and conservative) have lower attendance levels than the less educated orthodox Jews.¹¹

Few other countries have the range of denominational diversity of the U.S. However, when there is diversity, it generally follows the U.S. pattern. For example, in England the more highly educated groups have the least attendance. In West Germany and Switzerland where there are

¹¹ Two other groups, people in other religions and non-denominational Protestants, fit the basic relationships less well. This may occur because they are unusual and heterogeneous groups. The low attendance of non-denominational Protestants is unsurprising as this group is defined by its relatively low affiliation with any formal group.

substantial Catholic and Protestant populations, the Protestant groups have more education and are less likely to attend church.

III. A Statistical Framework

Changes in the sign of a relationship between individual-level and group-level regressions can occur when the key independent variable is correlated with a third variable that has a direct, opposite effect on the outcome and when this third variable is related to the sorting across macro-groups. The key condition for a individual level/group level switch is that the third variable times the degree to which this variable increases sorting across groups is *greater than* the impact of the key independent variable times the degree to which *that* variable influences sorting. Thus, this sort of switch is likely if the third variable is either very important in determining the outcome or if quite important in determining sorting across groups.

In the religion context, religious belief is a particularly natural “third” variable. We will later document that it is negatively correlated with years of education and quite correlated with denominational sorting and with religious attendance. We assume that individuals are characterized by education and religious beliefs, which are standard normal variables, denoted E and B with covariance $-\delta$. We define beliefs as those convictions which directly raise the perceived returns to religious activity, as such the connection with attendance is almost perfunctory. Examples of these beliefs include individual’s subjective probability that there is an afterlife or that payoffs in an afterlife are linked to religious attendance.

Attendance is assumed to be a standard normal variable that is a linear function of education and beliefs as follows: $A = \beta_E E + \beta_B B + \xi$. The effect of having higher education on religious attendance (holding beliefs constant) is denoted β_E . As we will discuss later, we interpret this direct effect as capturing abilities or interests which simultaneously increase the returns or decrease the costs of both school attendance and church going. The effect of having stronger beliefs on religious attendance (holding education constant) is denoted β_B . Both β_B and β_E are positive. Given this framework the coefficient from a univariate regression of attendance on education will be $\beta_E - \delta\beta_B$.

Denominations are assumed to be just groups of individuals. There is no direct impact of denomination on religious attendance holding beliefs constant. But there is sorting across denominations on the basis of both education and beliefs. We assume that there is a continuum of denominations, each indexed with “j”. This denomination index also has mean zero and variance one. We formalize sorting by assuming that for each individual: $E = \alpha_E j + \mu_E$ and $B = \alpha_B j + \mu_B$, where μ_E and μ_B are individual error terms, whose expectation (conditional upon j) equals zero.

The average belief in a denomination is therefore $\alpha_B j$ and the average education in a denomination is $\alpha_E j$. We order j so that $\alpha_B > 0$.¹² Higher levels of α_B will imply higher levels of sorting by belief—lower levels of α_B imply that beliefs are relatively independent of denomination. Higher levels of α_E suggest higher levels of sorting by education. The average attendance in denomination j equals $(\alpha_E \beta_E + \alpha_B \beta_B) j$.

The coefficient from a univariate regression across denominations where attendance is regressed on education will equal $\beta_E + \frac{\alpha_B}{\alpha_E} \beta_B$. This term can obviously only be negative as long as α_E is

negative, so sorting by education and belief must go in opposite directions (which we have already documented in Table 3). The joint condition for attendance to rise with education at the person level but for attendance to fall with education at the denomination level is:

$$\frac{1}{\delta} > \frac{\beta_B}{\beta_E} > -\frac{\alpha_E}{\alpha_B}. \text{ If } \delta \text{ is small, then the binding part of this condition is that } \alpha_B \beta_B > -\alpha_E \beta_E, \text{ or}$$

the product of the impact of belief times the degree of sorting on belief must be greater than the product of the impact of education times the degree of sorting on education. The switch in coefficients requires that beliefs be important relative to education in their effect on attendance or that beliefs be important relative to education in their effect on sorting.

We will try to show three things empirically. First, we will show that there is a negative connection between belief and education and that this effect is relatively weak, which ensures

¹² For the covariance of E and B to equal $-\delta$ the covariance of E and B, the covariance between μ_E and μ_B must equal $-\delta - \alpha_B \alpha_E$.

that $\frac{1}{\delta} > \frac{\beta_B}{\beta_E}$. Next we will compute estimates of the magnitude of the education and belief effects. Finally, we will calculate the extent to which there is sorting across denominations on the basis of beliefs and education.

IV. Education and Religious Belief

In this section, we first show the negative relationship between education and religious beliefs that we expect should impact the perceived returns to attendance either in daily life or in the hereafter.¹³ Then we will present a methodology for mapping our estimated coefficients into a range for the values of δ . We will end this section by presenting our interpretation of why education and beliefs are negatively related.

In Table IV, we look at the belief-education connection within the United States using four belief questions that should impact the returns to religious attendance. First, we look at the belief in heaven. The existence of heaven would seem to be closely connected to the belief that religious activities create tangible rewards after death. Second, we look at belief in miracles. Our interpretation is that miracles imply the activity of a deity in everyday life. Belief in the existence of an active deity means that there is a chance that this deity will reward the good before death. Our third dependant variable is the belief that the Bible is literally true. Since the Bible depicts many scenes in which God actively rewards his adherents, existence in the literal truth of the Bible implies the belief that God may reward the faithful. Finally, we look at belief in the devil. Presumably, the existence of the devil increases the need for God's protection.

We present three different probit specifications in Table IV. In the first row, we regress the belief variables on education with no other controls. In the second specification we include controls for income, age, marital status, gender, number of children and region. In the third specification, we include denomination fixed effects. If there is strong sorting by beliefs across denominations, then this third specification will underestimate the true education-belief connection. Nonetheless, we include results with denomination controls as an added check on the robustness of our results. We present marginal effects and standard probit coefficients.

¹³ Greeley (1988) is a pioneering piece of social science on the correlates of belief in life after death.

Since education is normalized, the marginal effect is interpreted as the impact of a one-standard deviation increase in education. In the case of belief in heaven a one-standard deviation increase in education is associated with a reduction in the probability of belief in heaven of between 4.2 and 5.6 percent. In the case of belief in miracles, the impact of education is smaller and insignificant. The effect of the belief in the Bible as literal truth is stronger—a one-standard deviation increase in education reduces belief in the literal truth of the Bible between 2 and 3.6 percentage points. In the case of belief in the devil, a one-standard deviation increase in education decreases beliefs between 1.6 and 4.7 percent.

Table V looks at the belief-education relationships outside of the United States using the World Values Survey. We show results for three questions: belief in God, belief in Heaven and belief in the Devil. In this case, we only include basic demographic controls: age, income, marital status and gender. In the first column our dependent variable is belief in God. In all but one of the countries (Switzerland is the exception) in this table there is a negative relationship between years of education and belief in God, and in many of the countries this relationship is statistically significant. In the second column, we look at belief in heaven. In this case, again only one of the coefficients is positive. Our third column looks at belief in the Devil. In this case, results are more mixed. Still, there is only one statistically significant positive coefficient. Overall, there is an impressive negative relationship between education and religious beliefs.

Estimating the Value of δ : At this point, we write down a framework that can translate these coefficients into estimates of δ -- the covariance of education and beliefs in the model. Following the model, we assume that each individual has a baseline intensity of belief, denoted B . Each individual question reflects a combination of this baseline belief and a question-specific error term, denoted ε_i that is normally distributed and independent of baseline beliefs. This question specific error term reflects the fact that some people may feel intensely about heaven and other people may feel intensely about miracles. Thus, for each question “ i ”, there is a question specific belief intensity B_i which we assume is a standard normal variable that is equal to $\omega_i B + \varepsilon_i$.

To connect the observed discrete answers with the continuous underlying variables, we assume that each question has a cutoff value k_i and individuals answer yes to the question if and only if $\omega_i B + \varepsilon_i$ is greater than k_i . If beliefs and education are jointly normally distributed (which we

assume) then B can be written as $-\delta E + \xi$. Individuals answer yes if and only if $\omega_i \xi - \delta \omega_i E + \varepsilon_j$ is greater than k_i , or if $\phi(\omega_i \xi + \varepsilon_i) > \phi(k_i - \delta \omega_i e)$. The value of ϕ is a constant chosen so that the variance of $\phi(\omega_i \xi + \varepsilon_i)$ equals one, which implies $\phi = \sqrt{1/(1 - \delta^2 \omega_i^2)}$, and we assume that $\phi(\omega_i \xi + \varepsilon_i)$ is normally distributed so that the problem can then be fit into a standard Probit estimation framework.

A Probit regression estimates the values of ϕk_i and $\phi \delta \omega_i$ using the fact that the probability that a respondent will answer no to a belief question equals to $\int_{-\infty}^{\phi k_i - \phi \delta \omega_i e} f(v) dv$ where v is a mean zero, variance one variable. If the estimate of $\phi \delta \omega_i$ equals some value x , then it must be true

that δ equals $\frac{x}{\omega_i} \sqrt{\frac{1}{1 + x^2}}$, so to recover the value of δ we must solve for ω_i .

The value of ω_i can be found by using the covariance in answers to different belief questions, if we assume joint normality of the answers to the different belief questions. We will consider two belief questions i and i' which have different cutoff values, k_i and $k_{i'}$ but where $\omega_i = \omega_{i'} = \omega$. As such B_i and $B_{i'}$ are normal variables with mean zero and variance one and with covariance $-\omega$. The values of k_i and $k_{i'}$ are directly implied by the proportion of the population that answers yes to the two questions. The value of ω can be inferred from the share of the population that answers no to both questions. More precisely if we let $Share(0,0)$ denote the fraction of the population that answers no to both belief questions, then this value solves:

$$(2) \text{ Share}(0,0) = \int_{-\infty}^{k_i} \int_{-\infty}^{k_{i'}} \frac{1}{2\pi \sqrt{1 - \omega^2}} e^{-\frac{(B_i^2 + B_{i'}^2 + 2\omega B_i B_{i'})}{2(1 - \omega^2)}} dB_i dB_{i'}$$

Since we have four different belief variables that we are using in the General Social Survey, we can estimate the covariance of beliefs (i.e. ω) with six different pairs of belief variables. When we do the six values of ω that we estimate are .78, .80, .84, .85, .87 and .99. The high value represents the extremely high degree of overlap between belief in the devil and belief in heaven. Since these values are tightly grouped together, we will use a value of .84 for our estimate of ω . Different values of ω , within a reasonable range, do not cause our estimates to change substantially.

In Table IV, we show our implied values of δ : these range from -.026 (for miracles with denomination fixed effects) to .299 (for belief in heaven with no other controls). Using our full range of estimated values of ω , the range of values of δ is between -.033 and .33. We believe that estimates without denomination fixed effects are the closest in spirit to the model. The value of δ in the middle of the distribution is about .13 which is our preferred estimated based on a value of ω of .84. Note that this value is fairly insensitive to different values of ω_j and would only rise to .14 if the lowest estimated value of ω is used.

In Table V, we estimate the values of δ for the three different belief variables for 19 countries. For the first two belief questions, δ is almost uniformly positive and lies between zero and .3. For belief in the devil δ is occasionally negative, and never greater than .21. In the cross-country evidence, the value of δ is again centered around .14, and again it generally seems quite positive. If we take .14 as an average value of δ , then the switch in coefficients requires that β_B must be less than seven times β_E and we will examine this condition in the next section. Now we briefly interpret the negative relationship between education and beliefs.

Why do religious beliefs decline with education? We believe that the heart of the negative correlation between education and belief is that ideologies of churches and schools are different. Schools often teach in a secular humanist tradition that views religion as a curiosity or superstition. The scientific claims of fundamentalist religions are generally disparaged in modern educational institutions. By some measures, school teachers tend to have lower levels of religious beliefs than average people. For example, 80 percent of teachers believe in heaven relative to 86 percent for the population as a whole. Educators as disparate as Horace Mann, Dewey and Scopes (see Larson, 1985), have opposed established religion in schools and education has often reflected their secular ideas.

In the United States, public schools have generally been strongly secular. In the 1840s, clergymen denounced the great champion of public schooling, Horace Mann, and the nascent common schools as “Godless” (Cremin, 1951). Certainly, relatively to the religious standards of the day, they were. In the early 19th century, older state constitutions were amended to prohibit state funding of religious teaching, and new constitutions were crafted with this prohibition. While the 19th century schools certainly used the Bible, they were non-sectarian and non-

sectarianism implied that schools were less religious than the prevailing society. In the religious world of the 1800s, a school would have to be relatively secular if, as required by law, “parents of all religious sects, Mohammedans and Jews, as well as Christians, can send their children to it, to receive the benefits of an education without doing violence to their religious belief” (New York Board of Aldermen, 1825, quoted in Cremin, 1951).

Why was public education in the United States non-sectarian and ultimately secularizing? The answer lies in the function of public schools. Support for public schools came from a desire to transform disparate, often troublesome groups into a unified, patriotic, well-informed citizenry. As Governor Seward of New York wrote in 1842: “the population of the city of New York, is by no means homogeneous; on the contrary, it is the object of education to make it so” (p. 172 in Cremin, 1951). As such, public schools were non-sectarian so they would attract “parents of all religious sects,” and they taught a secular nationalism aimed at homogenizing the citizenry, especially the recent Catholic immigrants. In some cases, the rules forbidding state funding of religious education were specifically written to deny money to Catholic schools. Eventually, the schools evolved into teaching a nationalist, not a religious, ideology that was at best indifferent to the established churches.

Outside the U.S., the pro-state, anti-church bias of schools is even more obvious. For example, Hans (1966) writes that Soviet schools “had to indoctrinate all pupils in dogmatic atheism,” because, after all, Marxism and Christianity were clearly hostile belief systems. Bismark engaged in a *kulturkampf* against Catholicism and used schools as a tool in his battle with the church. Nineteenth century French anti-clericalism was also virulent. Weber (1976) describes how the French state used education to replace Catholicism with a patriotic secular ideology:

A Catholic God, particularist and only identified with the fatherland by revisionists after the turn of the century, was replaced by a secular God: the fatherland and its living symbols, the army and the flag. Catechism was replaced by civic lessons. Biblical history, proscribed in secular schools, was replaced by the sainted history of France (Weber, 1976, p. 336).

Religious beliefs and education seem to be at odds, at least in part, because education was designed to replace the older identification with the Church with a newer identification with the state.

Of course, part of the negative connection between education and religious beliefs may also occur because Christianity often downplays secular achievements. Many statements in the Gospels (e.g. “it is easier for a rich man to enter the kingdom of heaven than for a camel to go through the eye of a needle,” “blessed are the poor for theirs is the kingdom of heaven”) suggest that religious acts are much more important than secular goals, including investment in human capital. Max Weber emphasized the hostility of traditional Catholicism to secular achievements.¹⁴ Moreover, if (following Iannacone, 1992) strong religious beliefs create an obligation to donate worldly goods, then strong beliefs will create a “religion tax” which will act to decrease the incentive to invest in secular education.¹⁵

If education and religion offer substitute belief systems and if religious beliefs downplay secular achievements or create a tax on earnings, then we should expect that beliefs reduce educational investment and education reduces the degree of beliefs. To show that education reduces beliefs, Table VI regresses beliefs on education using parents’ education as an instrument for education of the child. We include as controls, the denomination of the respondent at age 16 and the church attendance of the parent. For these instruments to be valid, parental education must increase the education of the child without having a direct impact on beliefs. Naturally, using parental education as an instrument in this regression only makes sense if we can control for other influences that might cause beliefs and might be correlated with adult education.

In three out of the four regressions, the impact of education is strong and negative. In the miracles regression, the impact of education is insignificant. While the assumptions needed for these instruments to be valid may be violated, we take this table as suggesting that there is at least some evidence suggesting that there is a causal link where education reduces beliefs.

A second test of the causal link between education and beliefs is to look at whether differences in school curricula influence adult beliefs, or the impact of education on adult beliefs. A particularly obvious determinant of school curricula across countries is communism. In general, following Marx’s deep antipathy to religion as “the opiate of the masses”, communist countries used the education system to discredit religion. Hans (1966) writes “the ideology of the eastern

¹⁴ Notably, Weber also claims that Calvinist Protestantism has a positive effect on investment. Of course, in our sample, Calvinist Protestantism is strongly negatively associated with beliefs.

¹⁵ The traditional institution of tithing represents a particularly formal example of such a tax. Likewise, if religions support the poor, this may have similar incentive effects.

part of Europe is anti-Catholic and is based not on traditional religion but on a philosophic conception of recent origin.”

As such, if education causally influences beliefs, then the level of beliefs should be lower in the former communist countries, and the impact of education on beliefs should also be lower in those places. To test this, in Table VII we looked at the mean value of beliefs and of different values of δ in communist and non-communist countries. The values of δ were calculated as above treating communist and non-communist areas as separate samples. In our estimates, we controlled for income, age, marital status, number of children and gender. We classified communist countries as those which were former members of the Warsaw Pact.

First, we look at belief in God. 71 percent of respondents in Warsaw Pact countries say they believe in God. 86 percent of respondents elsewhere say that they believe in God. The difference is extremely significant. Moreover, the impact of education on belief (i.e. the estimated value of δ) is .165 for Warsaw Pact countries and .112 for non-Warsaw Pact countries. This difference is quite statistically significant. Our second variable is belief in heaven. In this case, 39.7 percent of respondents in Warsaw Pact countries say that they believe. 63.3 percent of respondents outside the former Warsaw Pact areas say that they believe in heaven. The estimated value of δ is .17 in Warsaw Pact countries and .12 in non-Warsaw Pact countries. Finally, we look at belief in the Devil. Here 34.5 percent of Warsaw Pact countries believe in the Devil and 43.1 percent of non-Warsaw Pact respondents believe in the Devil. The estimate of δ is .105 in the Warsaw Pact countries and .017 elsewhere.

The fact that beliefs are lower in the former Warsaw Pact does confirm a prediction of our view that communist countries used schools to damage religion, but it also reflects the wide range of policies undertaken by those countries to fight against religions. The significantly lower coefficients on education (i.e. higher estimates of delta) are more surprising and seem more likely to be the result of the ideological slant of communist schools. While these results are certainly not conclusive, they do suggest that beliefs decline with schooling at least in some places because of the ideological goals of the schools.

To test the view that higher innate beliefs reduce educational investment, we regress education on beliefs of denomination at age 16, holding parental education constant. While this is certainly not a strong test, denomination might influence education for many reasons, and it provides some

evidence that the links between education and beliefs run in two directions. For example, if we regress adult education on the average belief in the Devil of the respondent's denomination (as of year 16), holding constant both mother's and father's education, age, cohort, gender, race and region, we estimate the following coefficient:

$$(3) \text{ Education} = -.45 * \text{Average Denominational Belief in Devil}, \quad R^2 = .32, N = 23,211 \\ (.066)$$

The standard error is in parentheses and is corrected for within denomination correlation of the error terms. There are of course many interpretations of this regression, but at least it raises the possibility that people with higher levels of initial beliefs are less likely to acquire more education.¹⁶

V. The Impact of Education and Beliefs on Attendance

Our estimates of the individual-level coefficient of education in attendance regressions provide us with estimates of $\beta_E - \delta\beta_B$. In Table I, these range from .12 to .18. In the previous section, we have estimated δ , and we believe that it lies between 0 and .3. Now we turn to estimating $\beta_B - \delta\beta_E$ by looking at the correlation between beliefs and attendance (following, among others, Azzi and Ehrenberg, 1975). We will estimate the value of $\beta_B - \delta\beta_E$ by regressing attendance on beliefs, but it is important to stress that the linear relationship between attendance, education and beliefs does not imply a causal model. Certainly, as Montgomery (1996) argues, attendance is likely to influence beliefs, and other variables will induce correlations between beliefs and attendance. As we are estimating a statistical, not an economic, model, we are not troubled by the direction of causality at this point.

Our basic estimation procedure uses the fact that our model implies that attendance equals $\beta_B - \delta\beta_E$ plus error terms that have expected value zero conditional upon beliefs. As such:

$$(4) \quad E(A|B_i > k_i) - E(A|B_i < k_i) = (\beta_B - \delta\beta_E)(E(B|B_i > k_i) - E(B|B_i < k_i)),$$

¹⁶ Chiswick (1983) and Tomes (1984) also document similar facts.

where $E(\cdot)$ represents the expectation operator, B_i represents the beliefs along a particular dimension (i.e. heaven) and k_i represents the cutoff for answering yes to this particular belief question. As such, $E(A|B_i > k_i)$ represents the mean value of attendance conditional upon saying yes to one of the belief questions.

The value of $E(A|B_i > k_i) - E(A|B_i < k_i)$ will be the estimated coefficient when attendance is regressed on one of the belief questions. The first column of Table VIII gives these values for our different belief measures. We have estimated $E(A|B_i > k_i) - E(A|B_i < k_i)$ with three specifications: no additional controls (which is closest in spirit to the model), demographic controls and both demographic and denominational controls. The different specifications do not significantly impact any of the effects of the different beliefs on attendance. In the case of belief in heaven, the estimated coefficients range from .72 to .77. In the case of belief in miracles, the estimated coefficients range from .58 to .62. In the case of belief in the literal truth of the Bible, the estimated coefficients range from .6 to .67. In the case of belief in the Devil, the estimated coefficients range from .5 to .53. In all cases, the coefficients are quite significant and robust to alternative specifications.

To estimate the value of $E(B|B_i > k_i) - E(B|B_i < k_i)$, we used numerical simulations and the fact that B and B_i are standard normal variables with covariance ω . We used a value of .84 for ω but our results are robust to a range of values. The value of k_i is directly implied by the share of respondents who answer yes to a particular belief question. Given this, it is straightforward to estimate the different values of $E(B|B_i > k_i) - E(B|B_i < k_i)$ for each belief question. The second column of Table VIII gives these estimates.

The final column of Table VIII gives our estimates of $\beta_B - \delta\beta_E$. This value is found by dividing $E(A|B_i > k_i) - E(A|B_i < k_i)$ by $E(B|B_i > k_i) - E(B|B_i < k_i)$. The range of estimates runs from .38 to .476. If we consider only the regressions without denomination controls, the estimates run from .40 to .476, and using our standard error estimates we feel quite confident that the values lie between .3 and .6. As such, our benchmark estimate of $\beta_B - \delta\beta_E$ is .45.

If our estimate of $\beta_B - \delta\beta_E$ equals “x”, our estimate of $\beta_E - \delta\beta_B$ equals “y”, then $\beta_B = (x + \delta y)/(1 - \delta^2)$ and our estimate of $\beta_E = (y + \delta x)/(1 - \delta^2)$. So if $x=.45$ and $y=.15$, and δ ranges from 0 to .3, then our estimate of β_B ranges from .45 to .54 and our estimate of β_E from .15 to .31. The ratio of β_B to β_E ranges from 1.73 to 3. Even taking our low estimate of .4 for $\beta_B - \delta\beta_E$ and our high estimate of .18 for $\beta_E - \delta\beta_B$, the lowest possible value of the ratio of β_B to β_E is 1.51. Thus, we will tend to think that the minimum value of this ratio is 1.5 and our best estimate of this ratio is 2.25.

Why is there a connection between education and church attendance? We don’t feel any need to explain why religious beliefs and church attendance would go together. However, the positive relationship between education and church attendance needs more of an explanation. We think that the most straightforward explanation of this phenomenon is that religion is a formal social activity, and education is correlated with all forms of formal social activity.

We provide four pieces of evidence suggesting that the positive connection between education and attendance comes from a general positive connection between schooling and social connection. First, we show that schooling is strongly associated with social behavior of all forms, both in the U.S. and throughout the world. Second, we show that religious attendance is highly correlated with other forms of social activity. Third, we show that schooling is not correlated with non-social religious behavior. Finally, we show that among asocial individuals there is a much weaker positive connection between schooling and social behavior.

Table IX examines the connection between education and a variety of social activities. While we have included all of the control variables that we use elsewhere, we only report the coefficients for education. For every variable, except for membership in labor unions, there is a strong positive effect of education on membership. The effect of education on religious attendance is weaker than the effect of education on most other social activities.

Our summary variable is a normalized (to a z-score) value of membership in number of organizations. While this variable is generally referred to as number of organizations, more precisely it refers to the number of different types of organizations of which the individual is a member. If an individual is a member of one literary society and one sports organization this would count as two, but if the individual is a member of five veterans organizations this will only

count as one. The basic education coefficient for this variable is .293—this coefficient is much higher than the education coefficients in the religion regressions. We also show that the number of close friends that an individual reports having rises with education.

Table X shows similar results using the World Values Survey for developed countries outside of the United States. Across the world there is a strong positive relationship between education and social membership. There are two countries in this restricted sample where the education-attendance relationship is negative (Austria and Norway), but in these cases the coefficient is not significant. In the full sample of 62 countries, there are only 4 cases where there is a negative relationship between education and group membership (Austria, Montenegro, Norway and the Philippines) and none of them are significant. Furthermore, the connection between education and organization membership is higher than the connection between education and religion in all but 4 out of 62 countries (Finland, Great Britain, Norway, and the Philippines). While far from conclusive, this suggests that the religion-education connection may be only one example of a pervasive education-social connection relationship.

Table XI presents further evidence on social connection and religion. Regression (1) shows that people who are more social along other dimensions (as measured by membership in organizations) attend church more often. A one standard deviation increase in membership in organizations raises religious attendance by .05 standard deviations. Regression (2) shows that if we look only at asocial individuals (defined as individuals who are not members of any organizations), the coefficient on education in the basic religion regression (comparable to Table 1, Regression 4) drops by two-thirds. This suggests that the education effect is working through the general education-social connection relationship.

Regressions (3) and (4) look at non-social religious activities. In regression (3), we show that education is not correlated with prayer, a religious activity that is presumably much less social. In regression (4), we show that education is orthogonal to feeling the presence of God. These more private forms of religious connection are not related to human capital.

Time diary evidence further documents and confirms that more educated people engage in different social activities from less educated people. For example, the 1995 American Use of Time Study Archive (generously provided to us by John Robinson) tells us that high school dropouts spend more than one hour per day more watching television than college graduates.

High school dropouts also spend an extra 16 minutes per day visiting and an extra 23 minutes per day “thinking and relaxing.” High school dropouts also spend more time in household chores and sleeping. The main activity that fills up the time of college graduates is work, but they also engage in more formal social activities, reading and paperwork. Overall, these facts paint a picture of lower levels of education being associated with informal interaction and watching television while higher levels of education are more associated with formal social activities that require investment.

Why do formal social activities rise with education? Our view is that education is associated with lower costs of these activities. These lower costs probably come about both because of treatment and selection. The treatment effect of education lies in the socialization function of schools (see, among others, Bowles and Gintis, 1976). Schools teach how to interact with others. Indeed, most of the key skills taught in school (reading, writing, etc.) are fundamentally communication skills. The selection effect of education lies in the fact that education requires many of the same skills as other formal social activities. Sitting still and listening is a skill required in both going to church and going to school.¹⁷

V. Sorting Across Denominations

In this section, we estimate the relative magnitude of sorting across denominations on the basis of beliefs and sorting on the basis of education. At this point, we will not address the mechanisms that create the sorting, but we will return to them at the end of this section.

Estimation of the parameter α_E is quite straightforward, and follows from the fact that the ratio of across denomination variance in education to total variance in education equals α_E^2 . Since we have normalized the variance of education to equal one, the variance of the mean level of education across denominations just equals α_E^2 . The standard deviation of education levels across denominations yields an estimate of α_E . We estimate the cross denomination variance in the mean level of education is .046, which implies that α_E equals .22.

¹⁷ Glaeser, Laibson and Sacerdote (2000) suggest that this schooling—social capital connection might be explained by rates of time preference.

To measure the extent to which there is sorting across denominations on the basis of beliefs, we need to address the fact that the observed level of belief in a denomination represents the proportion of the population who said yes to a one-zero question. We use the facts that $B_i = \omega B + \varepsilon = \omega \alpha_B j + \omega \mu_B + \varepsilon$, to note that respondents say yes to a belief question if and only if $\omega \mu_B + \varepsilon > k_i - \omega \alpha_B j$ or $\kappa(\omega \mu_B + \varepsilon_i) > \kappa(k_i - \omega \alpha_B j)$. The value of κ is chosen so that the variance of $\kappa(\omega \mu + \varepsilon_i)$ equals one, which implies that $\kappa = \sqrt{1/(1 - \alpha_B^2 \omega^2)}$.

The proportion of people in denomination j that answer no to belief question i , which we denote $N_i(j)$ therefore equals $\Phi\left((k_i - \omega \alpha_B j) \sqrt{\frac{1}{1 - \alpha_B^2 \omega^2}}\right)$, where $\Phi(\cdot)$ is the cumulative distribution for a standard normal. Therefore $Var(\Phi^{-1}(N_i(j))) = \frac{\alpha_B^2 \omega^2}{1 - \alpha_B^2 \omega^2}$.

In Table XII, we report the $Var(\Phi^{-1}(N_i(j)))$ for each of the belief variables and the associated value of α_B assuming that $\omega = .84$. The estimated values of α_B range from .33 to .505. We will think of .42 as our preferred estimate of α_B . Thus the ratio of α_B to α_E runs from -1.5 to -2.3. These findings suggest that there is more sorting across denominations on the basis of beliefs than there is sorting on the basis of education.

Combining the results of this section with those of the previous section, we find that there is both more sorting on the basis of beliefs than on the basis of education and that beliefs have more of an impact on attendance than education. If β_B equals .5, and β_E equals .23, and if α_B / α_E equals -1.5, the denomination level relationship of education and attendance is predicted to be -.47 which is very close to our estimated denomination-level coefficient in equation one.

Why is there sorting across denominations? Sorting across denominations reflects both the influence of denominations on beliefs and individuals choosing denominations. Indeed switching denominations is a pretty pervasive phenomenon. 25 percent of respondents in the GSS have changed denominations between adulthood and the year they respond to the survey. Of these switchers, 24 percent say that they switch because of marriage and another 30 percent say that they switch because of friends and family. Ten percent say that they switch because of location. Less than twenty percent say that they switch because of theology and clergy. As

social factors appear to dominate belief factors in switching, it is hard to believe that the switching drives the strong degree of sorting on the basis of beliefs.

It is probably more natural to believe that beliefs are themselves created by the denomination of one's birth. Denominations are fundamentally defined by their religious doctrines. While there are often significant social differences across denominations, denominations are ultimately defined by religious beliefs. Individual denominations appear to be able to shelter a wide range of worship styles (e.g. High vs. Low Episcopalians) and demographic groups, but people within a denomination generally share a core set of religious beliefs. New denominations usually form around leaders who have beliefs that differ from the beliefs of existing denominations.¹⁸ In many cases, such as the Baptists or the Presbyterians, denominations originate among social groups that are quite different from the social groups that currently make up these denominations.

In general, high attendance denominations (e.g. Mormons, Baptists, Catholics) strongly affirm rewards to religious adherence, usually in the afterlife. For example Evans (1975) describes the Mormon belief that "'exaltation' (with the highest eternal opportunities) must be earned by obedience to laws, ordinances, and commandments of the Kingdom." Hendricks (1975) writes of Catholic theology that "the more general belief is that unbaptized babies are forever cut off from heaven."¹⁹ This is not surprising as the Catholic Catechism (1995) states that "the Church does not know of any means other than Baptism that assures entry into eternal beatitude."

The doctrines of low attendance denominations (e.g. Episcopalians, Reform Jews) often explicitly deny any connection between religiosity and worldly success. These denominations may even deny any explicit connection between religious activity and rewards after death. Pittinger (1975) writes "Episcopalians do not believe in a physical heaven or hell." He continues "Episcopalians do not use [purgatory] in their official teaching, because they feel that it is often associated with crude ideas of payment of penalty and the like." While 30 percent of Baptists believe that adversity is a punishment for sin, only 9.7 percent of Episcopalians share that belief. Religious denominations appear to occupy a "product" space where some denominations claim an extremely high return to religious involvement and others think that the idea of penalties for

¹⁸ The two best count-examples are the Orthodox Church and the Church of England. In both cases, one could argue that schism occurred because of a desire for independence from Rome, not from beliefs about the nature of religion. However, even in these cases there were substantial doctrinal debates (e.g. the *filioque* controversy).

¹⁹ This belief has softened over the past two decades, and does not appear in the most recent Catechism.

irreligious behavior is “crude.” Our interpretation of the profound sorting across denominations on the basis of beliefs is that these official beliefs have influenced the beliefs of denomination members.

If denominations are basically belief systems, why, then, is there any correlation between education and beliefs at the denomination level? Part of this correlation must come from the negative impact of beliefs on education. The extent of sorting by education across denominations will be exacerbated by social spillovers. If spillovers in education acquisition exist, and if in general members of high belief denominations are less interested in education, then, as documented above, holding their education constant, parents who come from high belief denominations have less educated children.

Finally, the denomination-level connection between education and belief also occurs because belief systems may evolve to fit the predilections of denomination members. Thus, if Episcopalians tend to have had a great deal of education, and if education decreases beliefs, and if ministers try to cater to their parishioners, then we should expect the Episcopalian theology to become more secular. Certainly the history of the evolution of theologies confirms that at one point all denominations claimed stronger treatment effects of religious activity on outcomes, but over time, the high education denominations have reduced those claims more than the low education denominations.

VI. An Economic Model

This simple model, which is meant to rationalize the previous empirical work, is a joint model of the choice of education and religious attendance. Individuals are assumed to maximize the following function

$$(5) \quad R_E E + R_A A + \gamma BA - \tau BE - E^2 / 2 - A^2 / 2,$$

which leads to first order conditions $E = R_E - \tau B$ and $A = R_A + \gamma B$. The positive impact of religious belief on religious attendance should be uncontroversial. The negative impact of belief on educational choice comes from our view that secular beliefs and religious beliefs are often substitutes. As discussed above, religion often downplays the importance of secular success, and religion can lead to a greater emphasis on contributions to the church and can act essentially as a

tax on earnings. Furthermore, if education is relentlessly secular then attending school may be costly to high belief persons whose ideas differ radically from the ideas of teachers. The value of τ should equal the estimated value of δ or approximately .14.

Crucially, we assume that the perceived idiosyncratic returns to education and religious attendance are correlated. As discussed above, this correlation might work through returns of costs. The correlation might work through the discount factors—both religion and education can be seen as forms of investment—or because people who are intrinsically interested in book-learning are interested in that book learning if it is given in church or in school. Alternatively, people who are good at sitting still in class are good at sitting still in church. We model this by assuming that the returns to investing in attendance, denoted R_A equals $\lambda R_E + \zeta$, where ζ is an individual specific error term.

With this assumption, we can begin mapping this economic model into the statistical model of section III. In particular, attendance can be written as $A = \lambda E + (\gamma + \lambda\tau)B + \zeta$. Thus, $\beta_E = \lambda$ and $\beta_B = \gamma + \lambda\tau$. If β_E equals .23 and β_B equals .5, then λ equals .23, and γ equals .47.

Denominations are assumed only to impact only beliefs directly. In particular, we assume that beliefs equal $b_j + \iota_B$, where j is the denomination index and μ is an individual specific error term. Thus, average beliefs in a denomination equal b_j .

However, the returns to education are also influenced by the average education in the denomination. We think of this as stemming from the social factors involved in education and the fact that being around educated people increases the knowledge of education and the skills required in the education system. In particular, $R_E = r\hat{E}(j) + \iota_E$, where $\hat{E}(j)$ represents the denomination average education and ι_E is an individual specific error term. For our purposes, it would be enough if only parental education influences the perceived returns to education. This means that average education in the denomination equals $-\tau b_j / (1 - r)$. Mapping the parameters of this economic model back to the statistical model yields $b = \alpha_B$ and $-\tau b / (1 - r) = \alpha_E$. If our estimate of α_E / α_B is 1.5, then this implies that $r = .78$. This seems like a high number, but not implausibly high.

Thus, there are three major elements to this model. First, there is a substitutability between education and religious beliefs. Second, there is a correlation in abilities or interests, and people who are good at (or interested in) religion are likely to be good at (or interested in) school. Third, religious denominations influence beliefs directly and schooling indirectly, through individual beliefs and the average schooling level of the denomination.

VII. Conclusion

Within the U.S., education raises religious attendance at an individual level. This does not seem unusual to us because religious attendance is a major form of social interaction and education raises every other measurable form of social connection. We do not fully understand why education has this impact on social connection, but it seems to be the best explanation of the positive connection between education and religion. At the same time, there is a strong negative connection between attendance and education across religious groups within the U.S. and elsewhere. This can be explained by the fact that education is negatively connected religious belief and there is strong sorting across denominations on the basis of beliefs. We think that the negative correlation between beliefs and education occurs because education teaches a secular belief system that conflicts with religious ideology.

This paper has a number of implications for research outside of this area. We have described the conditions necessary for macro/micro coefficient changes. Our work on religious beliefs also re-emphasizes Bowles and Gintis' (1976) observation that education has a deep ideological component that may explain a number of important correlates with schooling. Finally, the connection between education and attendance emphasizes the important role that schooling plays in explaining social involvement. To understand social connection more generally, we must continue exploring why there is such a strong relationship between education and formal social activities.

References

- Azzi, C. and R. Ehrenberg. (1975) Household allocation of time and church attendance. *Journal of Political Economy* 83(1): 27-56.
- Becker, G. (1964). *Human capital*. Chicago: University of Chicago Press.
- Bowles, S. and H. Gintis. (1976) *Schooling in capitalist America : educational reform and the contradictions of economic life*. New York: Basic Books.
- Catechism of the Catholic Church* (1975). New York: Doubleday.
- Chiswick, B.R. (1983) The earnings and human capital of American Jews. *Journal of Human Resources* 18(3): 313-336.
- Cremin, L. (1951) *The American Common School*. New York: Columbia University Bureau of Publications.
- Durkheim, E. (1995) *Elementary forms of religious life*. Translated by Karen E. Fields. New York: Free Press.
- Evans, R. L. (1975) "What is a Mormon?" in Leo Rosten, Ed., *Religions of America*. New York: Simon and Schuster.
- Glaeser, E., Laibson, D. and B. Sacerdote. (2000) "The Economic Approach to Social Capital," NBER Working Paper #7728.
- Glaeser, E., Laibson, D., Scheinkman, J. and C. Soutter (2000) Measuring trust. *Quarterly Journal of Economics*.
- Glaeser, E. and J. Scheinkman (2000) "Non-market Interactions," NBER Working paper.
- Greeley, A. M. (1989) *Religious change in America*. Cambridge: Harvard University Press.
- Greeley, A. M. (1988) Correlates of belief in life after death. *Sociology and Social Research* 73(1): 3-8.
- Hans. (1966) Secularism in Eastern Europe. In Bereday, G. and J. Lauwerys eds. *The World Year Book of Education 1966: Church and State in Education*. London: Evans Brothers.
- Hendricks, D. W. (1975) "What is a Catholic?" pp. 39-67 in Leo Rosten, Ed., *Religions of America*. New York: Simon and Schuster.
- Iannaccone, L. (1998) Introduction to the economics of religion. *Journal of Economic Literature* 36(3): 1465-95.
- Iannaccone, L. (1992) Sacrifice and stigma: Reducing free-riding in cults, communes, and other collectives. *Journal of Political Economy* 100(2): 271-91.
- Larson, E. (1985) *Trial and error: The American controversy over creation and evolution*. Oxford: Oxford University Press.

- Lott, J. (1990) "An Explanation for the Public Provision of Schooling: The Importance of Indoctrination," *Journal of Law and Economics* 33: 192-232.
- Montgomery, J. D. (1996) Contemplations on the economic approach to religious behavior. *American Economic Review* 86(2): 443-447.
- Pittinger, W. N. (1975) "What is an Episcopalian?" pp. 96-111 in Leo Rosten, Ed., *Religions of America*. New York: Simon and Schuster.
- Putnam, R. D. (2000) *Bowling alone: The collapse and revival of American community*. New York: Simon and Schuster.
- Smith, I., Sawkins, J. W. and P. T. Seaman.(1998) The economics of religious participation: A cross-country study. *Kyklos* 51(1): 25-43.
- Stark, R., Iannaccone, L. and R. Finke (1996) Religion, science, and rationality. *American Economic Review* 86(2): 433-37.
- Tomes, Nigel. (1984) The Effects of Religion and Denomination on Earnings and the Returns to Human Capital. *Journal of Human Resources* 19 (4): 472-88.
- Weber, E. (1976) *Peasants into Frenchmen: The Modernization of Rural France*. Stanford: Stanford University Press.

Table I
OLS of Attendance on Education and other Controls

	(1)	(2)	(3)	(4)
	Attendance (if born after 1945)	Attendance (if born after 1945)	Attendance (if born after 1945)	Attendance (Whole Sample)
Years of education	0.121 (0.008)	0.160 (0.008)	0.189 (0.008)	0.152 (0.006)
Dummy for jewish		-1.086 (0.059)	-0.959 (0.059)	-0.890 (0.039)
Dummy for catholic		-0.415 (0.025)	-0.327 (0.025)	-0.152 (0.018)
Dummy for baptist		-0.344 (0.026)	-0.403 (0.027)	-0.342 (0.018)
Dummy for lutheran		-0.557 (0.037)	-0.492 (0.036)	-0.402 (0.024)
Dummy for episcopal		-0.687 (0.058)	-0.624 (0.056)	-0.617 (0.035)
Dummy for methodist		-0.630 (0.034)	-0.623 (0.033)	-0.557 (0.021)
Dummy for presbyterian		-0.598 (0.046)	-0.550 (0.045)	-0.548 (0.028)
Dummy for nondenominational protestant		-0.539 (0.042)	-0.470 (0.041)	-0.555 (0.030)
Dummy for other religion		-0.639 (0.044)	-0.540 (0.044)	-0.434 (0.036)
Log of income			0.024 (0.019)	0.046 (0.013)
Dummy variable =1 for income missing			0.113 (0.057)	0.082 (0.037)
Dummy variable =1 for black			0.240 (0.024)	0.289 (0.018)
Dummy variable =1 for female			0.169 (0.023)	0.277 (0.017)
Birth year of respondent			2.14E-4 (0.001)	-0.009 (4.86E-4)
Dummy variable=1 if married			0.182 (0.026)	0.161 (0.018)
Female * married			0.012 (0.032)	-0.037 (0.022)
Number of children between ages of 0 and 5			0.054 (0.012)	0.028 (0.010)
Number of children between ages of 6 and 12			0.112 (0.011)	0.069 (0.008)
Number of children between ages of 13 and 19			0.104 (0.014)	0.034 (0.009)
Log of population of city of residence			-0.007 (0.004)	-0.013 (0.003)
Dummy variable =1 for age less than 30			-0.027 (0.027)	-0.033 (0.022)
Dummy variable =1 for age 30-39			-0.050 (0.024)	-0.077 (0.019)
Dummy variable =1 for age 50-59			0.147 (0.064)	-0.013 (0.016)

Notes: Attendance and education are standardized to be mean 0, variance 1. Standard errors in parentheses. Also includes region dummies

Table II
OLS of Attendance on Education: World Values Survey

	(1)	(2)	Description
	Attendance on Education and Age	Attendance on Education and Age w/ Controls	
<i>country</i>			
France	0.116 (0.024)	0.094 (0.034)	63% Catholic 17% no religion
Great Britain	0.223 (0.021)	0.208 (0.032)	37% no religion 37% Anglican
West	-0.024 (0.016)	0.015 (0.022)	43% Catholic 43% Lutheran
Germany	-0.061 (0.018)	-0.007 (0.032)	93% Catholic
Italy	-0.041 (0.023)	-0.01 (0.036)	55% no religion 22% Catholic, 12% other Protestant
Netherlands	0.034 (0.013)	0.062 (0.019)	85% Catholic
Spain	0.104 (0.018)	0.129 (0.022)	91% Protestant
Norway	0.096 (0.021)	0.096 (0.026)	83% Lutheran
Sweden	-0.073 (0.03)	0.026 (0.041)	54% Catholic 43% Protestant
Switzerland	-0.055 (0.032)	-0.024 (0.037)	81% Catholic
Austria	0.044 (0.023)	0.022 (0.033)	93% Catholic
Ireland	-0.139 (0.025)	-0.148 (0.029)	95% Catholic
Poland	-0.115 (0.022)	-0.086 (0.026)	58% Russian Orthodox 33% no religion
Ukraine	-0.063 (0.017)	-0.046 (0.02)	70% no religion 20% Russian Orthodox
Russia	-0.153 (0.032)	-0.136 (0.037)	70% Romanian Orthodox
Romania	0.004 (0.022)	0.038 (0.026)	64% no religion 27% Lutheran
East German	-0.01 (0.019)	0.003 (0.025)	58% no religion 23% Catholic
Canada	-0.006 (0.021)	0.055 (0.029)	27% no religion 25% Anglican, 21% Catholic
Australia	-0.003 (0.019)	-0.024 (0.024)	33% Hindu 24% Shinto
Japan	-0.01 (0.033)	-0.033 (0.039)	97% no religion
China	0.005 (0.026)	0.02 (0.049)	70% Catholic
Brazil	-0.015 (0.017)	0.052 (0.021)	84% Hindu
India			

Notes: Each cell is from a separate regression of attendance on education. Attendance and education are standardized to be mean 0, variance 1 within each country. Education variable is age when finished schooling. Attendance variable is an index based on frequency of attendance (once a day, 2-3 times per week, once per week, 1-2 times per month, less than once per month, 1-2 times per year, never.) Columns (1) and (2) include dummies for 4 age categories. Column (2) includes controls for income, female, married, number of children.

Table III
Means of Belief and Social Measures By Denomination

	(1) Baptist	(2) Other protest- ant	(3) Cath- olic	(4) Meth- odist	(5) Luth- eran	(6) Non- denom protest- ant	(7) Presby- terian	(8) Other religion	(9) Epis- copal	(10) Jew
<i>Mean of...</i>										
Standardized Education	-0.302	-0.123	0.040	0.043	0.057	0.122	0.338	0.470	0.563	0.732
Standardized Attendance	0.144	0.441	0.188	-0.059	0.005	-0.221	-0.076	-0.150	-0.129	-0.475
Belief in afterlife	0.781	0.805	0.710	0.751	0.754	0.749	0.744	0.686	0.698	0.319
Belief in Heaven	0.948	0.913	0.844	0.869	0.863	0.822	0.832	0.620	0.815	0.304
Belief in Devil	0.774	0.773	0.567	0.592	0.674	0.659	0.689	0.286	0.630	0.103
Belief in Miracles	0.839	0.779	0.745	0.695	0.737	0.773	0.724	0.643	0.630	0.277
Adversity is punishment for sins	0.865	0.768	0.667	0.667	0.693	0.708	0.694	0.514	0.642	0.174
Bible is literal truth	0.908	0.900	0.800	0.842	0.860	0.854	0.830	0.600	0.842	0.234
Participate in church activities	0.444	0.667	0.377	0.404	0.347	0.500	0.326	0.563	0.200	0.667
Number friends in congregation	0.438	0.513	0.497	0.502	0.367	0.400	0.258	0.600	0.333	0.514
Rely on help from congregation	0.774	0.841	0.597	0.813	0.736	0.929	0.656	0.778	0.737	0.600

Notes: First two variables are standardized to mean 0, variance 1 within the sample. Remaining variables are (0-1).
GSS data.

Table IV
GSS
Effect of Education on Belief

	∂ belief/ ∂ education	Coeff on Educ- ation	Implied value of δ	N	Pseudo R- squared
BELIEF IN HEAVEN					
mean= .859					
Education w/ no additional controls	-0.056	-.258 (.037)	0.299	2141	.03
Education w/ individual controls	-0.050	-.245 (.041)	0.284	2141	.07
Education w/ denomination f.e.s and individual controls	-0.042	-.210 (.043)	0.246	2126	.11
BELIEF IN MIRACLES					
mean=.747					
Education w/ no additional controls	-0.016	-.051 (.031)	0.061	2128	.01
Education w/ individual controls	-0.010	-.031 (.035)	0.037	2128	.03
Education w/ denomination f.e.s and individual controls	0.007	.022 (.036)	0.026	2113	.05
BELIEF IN BIBLE AS LITERAL TRUTH					
mean=.832					
Education w/ no additional controls	-0.036	-.143 (.034)	0.169	2188	.01
Education w/ individual controls	-0.033	-.136 (.038)	0.161	2188	.04
Education w/ denomination f.e.s and individual controls	-0.020	-.085 (.039)	0.101	2173	.08
BELIEF IN DEVIL					
mean=.649					
Education w/ no additional controls	-0.047	-.127 (.042)	0.151	1118	.01
Education w/ individual controls	-0.028	-.076 (.046)	0.091	1118	.04
Education w/ denomination f.e.s and individual controls	-0.016	-.044 (.048)	0.053	1114	.07

Notes: GSS data. Each row is for a separate probit regression. The first column shows the marginal effect from the probit. The second column shows the probit coefficients and standard error. The third column shows the implied value of delta which is the covariance between education and belief. Individual controls are for age, income, married, female, number of children, and region.

Table V
World Values Survey: Effect of Education on Beliefs

<i>Country</i>	Belief in God		Belief in Heaven		Belief in Devil	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
	∂ belief/ ∂ educ	probit coeff	∂ belief/ ∂ educ	probit coeff	∂ belief/ ∂ educ	probit coeff
	(std error)	Implied value of δ	(std error)	Implied value of δ	(std error)	Implied value of δ
France	-0.026 (0.017)	-0.073 0.087	-0.011 (0.017)	-0.031 0.037	0.019 (0.014)	0.071 -0.085
Britain	-0.035 (0.012)	-0.147 0.174	-0.07 (0.017)	-0.189 0.222	-0.027 (0.017)	-0.075 0.089
W Germany	-0.012 (0.009)	-0.050 0.060	-0.067 (0.013)	-0.172 0.203	-0.024 (0.01)	-0.085 0.101
Netherlands	-0.009 (0.017)	-0.029 0.035	-0.053 (0.02)	-0.133 0.158	0.003 (0.016)	0.010 -0.012
Spain	-0.009 (0.005)	-0.072 0.086	0.014 (0.011)	0.035 -0.042	0.021 (0.011)	0.055 -0.066
Ireland	-0.003 (0.002)	-0.282 0.324	-0.004 (0.009)	-0.03 0.036	0.042 (0.021)	0.108 -0.128
USA	-0.012 (0.003)	-0.249 0.289	-0.043 (0.006)	-0.253 0.293	-0.03 (0.009)	-0.09 0.107
Canada	-0.016 (0.006)	-0.137 0.162	-0.02 (0.012)	-0.063 0.075	0.029 (0.013)	0.073 -0.087
Japan	-0.04 (0.015)	-0.105 0.125	-0.046 (0.016)	-0.125 0.148	-0.023 (0.012)	-0.094 0.112
Australia	-0.02 (0.01)	-0.094 0.112	-0.04 (0.014)	-0.114 0.135	-0.01 (0.016)	-0.025 0.03
Norway	-0.006 (0.011)	-0.017 0.020	-0.009 (0.012)	-0.022 0.026	-0.011 (0.01)	-0.035 0.042
Poland	-0.017 (0.006)	-0.363 0.408	-0.07 (0.019)	-0.255 0.295	-0.035 (0.024)	-0.088 0.105
Switzerland	0.014 (0.014)	0.078 -0.093	-0.006 (0.024)	-0.014 0.017	-0.001 (0.022)	-0.002 0.002
Brazil	-0.006 (0.003)	-0.196 0.23	-0.045 (0.02)	-0.156 0.184	-0.015 (0.026)	-0.039 0.047
India	-0.002 (0.004)	-0.016 0.019	-0.064 (0.012)	-0.161 0.19	-0.035 (0.01)	-0.102 0.121
E Germany	-0.002 (0.014)	-0.005 0.006	-0.021 (0.012)	-0.073 0.087	0.002 (0.008)	0.015 -0.018
Romania	-0.017 (0.007)	-0.249 0.289	-0.178 (0.022)	-0.478 0.515	-0.074 (0.021)	-0.185 0.217
Ukraine	-0.03 (0.012)	-0.099 0.118	-0.045 (0.016)	-0.114 0.135	-0.035 (0.016)	-0.088 0.105
Russia	-0.053 (0.012)	-0.136 0.161	-0.046 (0.01)	-0.151 0.178	-0.033 (0.01)	-0.102 0.121

Notes: Columns (1a), (2a), and (3a) show probit coefficients from regressions of belief on education. Columns (1b), (2b), and (3b) show the marginal effects and the implied delta, which is the covariance between education and belief. Education variable is age when finished schooling standardized to 0-1. Regressions include dummies for 4 age categories.

Table VI
IV Estimates of Effect of Education on Beliefs

	(1)	(2)	(3)	(4)
	Belief in Heaven	Belief in Bible as Literal Truth	Belief in Miracles	Belef in Devil
Education	-0.089 (0.024)	-0.119 (0.026)	-0.006 (0.031)	-0.174 (0.050)
Observations	1424	1449	1416	749
R-squared	0.19	0.16	0.15	0.14

Estimated using two stage least squares with a linear probability model. Instruments for own education include mother's education and father's education. Regressions also include controls for religious denomination at age 16, own attendance, mother and father's attendance, income, age dummies, female, married.

Table VII
Effect of Education on Belief
By Former Communist Countries vs. All Others

	Communist (Warsaw Pact) Countries	All Others	T-test for difference in means
Belief in God:			
mean	.712	.865	61.556
delta	0.165	0.112	19.49
Belief in Heaven:			
mean	.397	.633	72.965
delta	0.171	0.120	11.25
Belief in Devil:			
mean	.345	.431	26.503
delta	0.105	0.017	16.54

World Values Survey data. The table shows the mean belief levels in former-Communist countries and all others. Below the mean is the implied value of delta, which is the covariance of education and belief. The t-statistic for the difference in delta is estimated using a probit regression that includes respondents from communist and non-communist countries

Table VIII
GSS
Effect of Belief on Attendance

	∂ attendance / ∂ belief	Difference in E(Belief) given belief measure = yes versus no	Ratio
BELIEF IN HEAVEN			
mean= .859			
Attendance on belief w/ no additional controls	.767 (.063)	1.61	0.476 (0.05)
Attendance on belief w/ individual controls	.733 (.063)	1.61	0.455 (0.05)
Attendance on belief w/ denomination f.e.s and individual controls	.719 (.065)	1.61	0.447 (0.051)
BELIEF IN MIRACLES			
mean=.747			
Attendance on belief w/ no additional controls	.617 (.051)	1.48	0.417 (0.042)
Attendance on belief w/ individual controls	.595 (.050)	1.48	0.402 (0.041)
Attendance on belief w/ denomination f.e.s and individual controls	.575 (.051)	1.48	0.389 (0.042)
BELIEF IN BIBLE AS LITERAL TRUTH			
mean=.832			
Attendance on belief w/ no additional controls	.672 (.058)	1.59	0.423 (0.046)
Attendance on belief w/ individual controls	.627 (.058)	1.59	0.423 (0.046)
Attendance on belief w/ denomination f.e.s and individual controls	.604 (.060)	1.59	0.380 (0.048)
BELIEF IN DEVIL			
mean=.649			
Attendance on belief w/ no additional controls	.534 (.063)	1.22	0.438 (0.057)
Attendance on belief w/ individual controls	.522 (.063)	1.22	0.428 (0.057)
Attendance on belief w/ denomination f.e.s and individual controls	.495 (.064)	1.22	0.406 (0.058)

Column (1) gives the marginal effect of belief on attendance from a probit regression. Column (2) is the expected value of the underlying standardized belief measure, given the answer to the yes-no question. The ratio of column (1) to column (2) is equal to the degree of sorting on beliefs.

Table IX
GSS
Effect of Education on Sociability

	Probit Coefficient on Education*	$\partial x/\partial y$ from probit	Implied value of δ
Total Number of Memberships	0.293 (0.006)		
Member of Church Group	0.239 (0.012)	0.091 (0.004)	0.259
Member of Fraternal Group	0.260 (0.016)	0.036 (0.002)	0.280
Member of Service Club	0.361 (0.016)	0.056 (0.002)	0.378
Member of Veteran's Group	0.058 (0.017)	0.006 (0.002)	0.065
Member of Political Club	0.317 (0.021)	0.023 (0.001)	0.336
Member of Labor union	-0.121 (0.015)	-0.023 (0.003)	0.134
Member of a Sports Group	0.225 (0.014)	0.056 (0.003)	0.244
Member of Youth Group	0.234 (0.017)	0.035 (0.002)	0.254
Member of School Service Group	0.383 (0.016)	0.067 (0.003)	0.398
Member of Hobby or Garden Club	0.211 (0.016)	0.034 (0.003)	0.230
Member of Nationality Group	0.243 (0.021)	0.016 (0.001)	0.263
Member of Farm Organization	0.120 (0.022)	0.006 (0.001)	0.133
Member of Literary or Art Discussion or Study Group	0.493 (0.018)	0.062 (0.002)	0.492
Member of Any Other Group	0.170 (0.015)	0.030 (0.003)	0.187
Number Close Friends	0.060 (0.019)		

Notes: GSS data. Each row is a separate regression. Value reported is coefficient of membership on education with standard errors in parentheses. Regressions include controls for age, income, married, female, number of children, and region. *OLS is used for number of memberships and number of close friends. All other regressions are probits.

Table X
World Values Survey
OLS of Membership on Education

	Number of Social Memberships
<i>country</i>	
France	0.249 (0.035)
Great Britain	0.207 (0.028)
West	0.167
Germany	(0.019)
Italy	0.085 (0.028)
Netherlands	0.145 (0.034)
Spain	0.187 (0.017)
Norway	-0.005 (0.021)
Switzerland	0.166 (0.034)
Austria	-0.021 (0.037)
Ireland	0.179 (0.034)
Ukraine	0.12 (0.022)
Russia	0.184 (0.017)
Romania	0.201 (0.032)
East German	0.168 (0.022)
USA	0.262 (0.021)
Canada	0.148 (0.026)
Australia	0.2 (0.025)
Japan	0.148 (0.026)
China	0.176 (0.033)
Brazil	0.25 (0.02)
India	0.127 (0.025)

Notes: Membership and education are standardized to be mean 0, variance 1 within each country. Education variable is age when finished schooling. Regressions include dummies for 4 age categories, female, married, income, and number of children. Membership is number of memberships in voluntary organizations for sports, arts, professional organizations, social organizations, charity organizations, and environmental organizations.

Table XI
GSS
OLS of Attend, Pray, Feel God on Education and Sociability

	(1) Attend	(2) Attend <i>For people with memberships =0</i>	(3) Pray	(4) Feel God's Presence
Education	0.134 (0.008)	0.064 (0.012)	-0.005 (0.007)	-0.028 (0.025)
Number of Memberships (excl. church related)	0.053 (0.007)			
R-squared	.10	.09	.16	.10
N	18495	7176	14359	1344

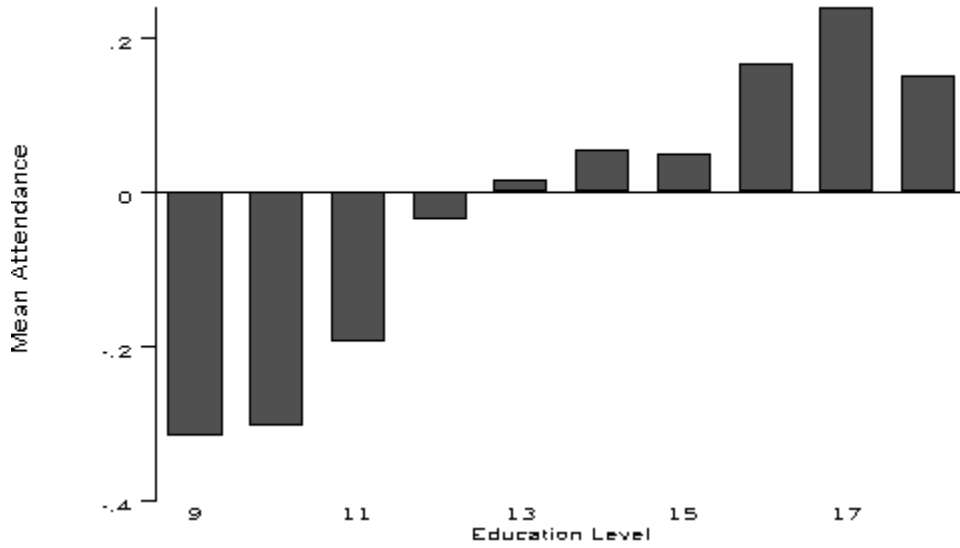
Notes: GSS data. Each column is a separate regression. Regressions include controls for age, income, married, female, number of children, and region.

Table XII
Determinants of Sorting Across Denominations

	Var[inverse cum normal (proportion with belief=NO in denomination j)]	Estimated Alpha B
Belief in heaven	.153 (.085)	.505 (.176)
Belief in miracles	.071 (.047)	.329 (.118)
Belief in Bible as literal truth	.127 (.089)	.455 (.186)
Belief in the Devil	.153 (.084)	.507 (.170)

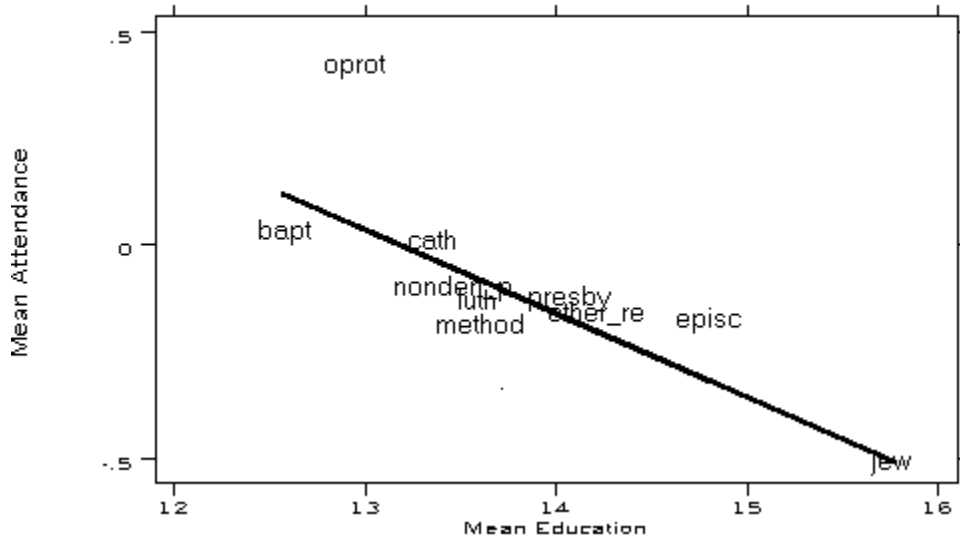
Notes: The table estimates the degree of sorting on beliefs (α_b). Page 22 of the text shows how the variance in column (1) yields an estimate of the degree of sorting on beliefs. GSS data. Standard errors estimated by bootstrapping.

Figure 1
Mean Attendance By Education Level



Note: Attendance is expressed as an index with mean 0, standard deviation 1. Excludes born pre-1945.

Figure 2
Mean Attendance on Mean Education By Denomination



Appendix I

Attend church	Ranges from zero to one indicating the frequency with which the respondent attends religious services. A one indicates respondent attends more than once a week while a zero means they attend never (original variable ranged from 0 to 8 e.g. a 2 indicated that respondent attended a couple times a year, 4 once a month, and 6 nearly every week and so on).
Belief in afterlife	Equals one if the respondent believes there is life after death and zero if respondent does not believe there is life after death.
Birth year	Represents the respondent's year of birth. Ranges from 0 to 93. The oldest person was born in 1883.
Education	Years of education.
Health	Ranges from zero to one with one indicating that the respondent believes their health to be excellent and zero indicating poor health (original variable ranged from one to four).
Join Religion	A dummy variable equal to 1 if the respondent reports a current religious affiliation and "No religion" at age 16.
Leave Religion	A dummy variable equal to 1 if the respondent's current religious affiliation is "No religion" and age 16 religious affiliation is a religious group.
Log of city population	Logarithm of the population of the respondent's city.
Log of income	Logarithm of family real income in 1986 dollars for the previous year. Set to 0 when missing (dummy variable for income missing controls for this).
Mother/Father attend church	Ranges from zero to one with one being mother/father attended religious services more than once a week and zero being she/he attended religious services never.
Near God	Ranges from zero to one with one indicating respondent feels "extremely close to god" and zero being "does not believe in god" (original variable ranged from one to five).
<i>Non-religious membership</i>	<i>Ranges from one to fifteen indicating the number on non-religious groups the respondent is a member of.</i>
Pray often	Ranges from zero to one with one being prays several times a day and zero never (original variable ranged from one to six).
Religion size	The proportion of the GSS respondents in the respondent's home state who are members of the their religious group at age 16.
School group membership	A dummy variable equal to 1 if the respondent is a member of a school related group.
Stay in state	A dummy variable equal to 1 if the respondent's current state of residence is the same as his or her age 16 state of residence