Religiosity and Life Satisfaction
(A Multilevel Investigation Across Nations)

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Abstract

In this paper I investigate the relationship between religiosity and life satisfaction in 79 nations using World Values Survey data. To solve methodological problems evident in previous work a random coefficient multilevel model is employed to account for the fact that individuals are nested within countries. Results indicate that the dimensions of religiosity that relate to social capital predict higher life satisfaction and religious people are happier in religious nations. In other words, it is not only religiosity per se that makes people happy but rather a social setting it offers. People have so called 'need to belong' and religion helps to satisfy it.

KEYWORDS: Life Satisfaction, Religion, World Values Survey

Introduction

This paper investigates the effect of religiosity on life satisfaction[1]. There is a body of literature to date about religiosity and happiness, and the most comprehensive review of religiosity and its relation to health and well being is Koenig et al. (2001). Authors reviewed 100 studies on the relationship between religion and life satisfaction. 80 % report positive correlation, 13% find no association and 7% mixed or complex results; Only one study finds negative association (Koenig et al., 2001, pg.101). The major conclusion from the extant literature is that:

- Religious faith predicts happiness; it creates purpose in life
- Church attendance predicts happiness; it creates sense of belonging

*I am indebted to . All mistakes are mine.

[1] Life satisfaction and happiness are conceptually different. The former refers to cognition while the latter refers to affect. For simplicity I use them interchangibly and specifically I mean life satisfaction.

Religiosity is a latent (unobserved) concept that we can proxy with responses to survey questionnaires. In this paper I argue that there are two dimensions (types) of religiosity:

- `social religiosity`, i.e. church attendance , participation in religious organizations
- `individual religiosity`, i.e. belief in god

These are quite distinct dimensions as revealed by correspondence and regression analyses. Social aspect refers to social capital, 'the need to belong', whereas private aspect is more individual transcendent experience. Life Satisfaction highly correlates with church attendance, but to a lesser extent with belief in god. Moreover, as this research demonstrates, belief in god has no impact, or even negative impact on life satisfaction when controlling for social capital.

The relationship of different dimensions of religiosity with life satisfaction is not the same for different people, countries and cultures. Most authors implied yet not rigorously tested (Snoep, 20080601) that religion is context dependent:

- religion is more important in countries with poor social welfare
- church is more important if social mobility is high
- religion is more important in religious societies

There is some evidence that it is rather church attendance (social activity) rather than personal belief (in god) that predicts higher life satisfaction (Diener et al., 1999). In other words, it is more about social capital than personal belief: interpersonal contact, church-related friends. I will discuss this possibility in greater detail and test empirically. There are also interactive effects that make relationship religiosity-happiness stronger:

- lower income
- elderly
- less education

- less professional occupation
- loneliness
- poor health

Koenig et al. (2001, pg.101) reminds us that little or no research has been done to compare people with different religious beliefs and backgrounds. Also, most findings to date are based on the US data (mostly General Social Survey) (e.g. Ferriss (20020901)) or a comparable survey in a single country. There is a lack of cross-national research with only few examples that directly focus on religion (e.g. Clark and Lelkes (2009)). More strikingly there are no studies using appropriate methodological tools (multilevel) to study religion and life satisfaction across nations. This study aims at filing this gap.

These few studies that analyzed life satisfaction in international context are following. Clark and Lelkes (2009) analyzed 90,000 individuals in 26 European nations using European Social Survey and found that the mean religiosity at region level boosts life satisfaction of religious and non-religious people. On the other hand atheistic regions make religious and atheist people less satisfied Clark and Lelkes (2009) , however, analyzed only European countries, and used inappropriate methodology treating group-level observations and person-level observations as if they were collected at the same level. Therefore, the results suffer from so called atomistic fallacy, the fallacy one commits when making inferences about groups or aggregates from individuals.

Data Description

This study utilized following sources of data:

- **wvs**, World Values Survey, person-level data from the survey in 79 nations, `www.worldvaluessurvey.org`
- **kkz**, country level governance indicators, (Kaufmann et al., 2006)

- **wdi**, World Development Indicators, economic data from the World Bank, `www.worldbank.org/data`

All religiosity measures and life satisfaction measure come from WVS. A detailed description of WVS is in Appendix on page 19. Of particular interest to happiness researchers is one simple World Values Survey question: 'All things considered, how satisfied are you with your life as a whole these days ?' Respondents were asked to answer this question on a scale from 1 to 10, where 10 is the most satisfied. Their responses are used as a dependent variable in this study. Descriptions of all WVS religiosity items used in this study are set in Table 1. For simplicity they were recoded from the original survey responses so that the higher value means "more", or in case of dummy variables one means yes. Frequency tables of these indicators are set down in Appendix on page 22.

Table 1: Description of Variables

Variable	Survey Question
social religiosity	
time with people at church	I'm going to ask how often you do certain things. For each activity,would you say you do them every week or nearly every week; once or twice a month; only a few times a year; or not at all? Spend time with people at your church, mosque or synagogue
belong to religious organization	Please look carefully at the following list of voluntary organizations and activities and say...which, if any, do you belong to? Religious or church organizations
attend religious services	Apart from weddings, funerals and christenings, about how often do you attend religious services these days?
individual religiosity	
believe in: god	Which, if any, of the following do you believe in? ((Read out and code one answer for each)) God
importance of god	importance of god? Please use this scale to indicate- 10 means very important and 1 means not at all important.
belong to religious denomination	Do you belong to a religious denomination?
religion important in life	Please say, for each of the following, how important it is in your life: Religion
religious	Independently of whether you go to church or not, would you say you are (Read out) 'A religious person'

The design of this study is cross-sectional, however survey data were collected over 1997-2004. Country-level data were matched on the year of survey for each country[2]. For

[2]Some missing values were imputed. If PCGDP (Per Capita Gross Domestic Product), inflation, or unemployment were missing for time t, they were replaced with a value for previous/next year. Life expectancy was replaced with first non-missing value six years ahead/before.

details see Appendix on page 18. Again, data is of multilevel nature; there are two units of observation: persons nested within countries. The primary model is of the following form:

$$LifeSatisfaction_{ij} = \mathbf{X}_{ijm}\beta_m + \mathbf{Z}_{jn}\gamma_n + \epsilon_{ij} \quad (1)$$

Vectors **X** and **Z** are the different combinations of individual and country-level control variables set down in Tables 2 and 3. Vector **X** also contains religiosity measures as discussed above.

Table 2: Person-level variables included in **X**.

Variable	Definition and Source
	World Values Survey `www.worldvaluessurvey.org/`
Life Satisfaction	All things considered, how satisfied are you with your life as a whole these days? 1(low) to 10(high)
Income	Income counting all wages, salaries, pensions and other incomes: 1(low) to 10(high)
Freedom	Feeling of freedom: 1(none at all) to 10(a great deal)
Education	Highest level of education attained: 1(low) to 10(high)
Health	State of health (subjective): 1(very poor) to 5(very good)
Friends	Time with friends: 1(not at all); 2(a few times a year); 3(once/twice a month); 4(weekly)
Unemployed	1(unemployed); 0(otherwise)
Female	1(female); 0(otherwise)
Community	Community involvment: 1(weekly) to 4(not at all)
Church	Belong to church: 1(yes); 0(no)
Culture	Belong to cultural association; 1(yes); 0(no)
Recreation	Belong to recreational association: 1(yes); 0(no)

Table 3: Country-level variables included in **Z**.

Variable	Definition and Sources
	World Development Indicators `http://publications.worldbank.org/WDI/`
gdp	GDP per capita based on purchasing power parity in constant 2000 international $
Misery Index	Sum of inflation and unemployment
-2.5(low) to 2.5(high)	**Governance Indicators** `www.worldbank.org/wbi/governance/govdata/`
Voice and Accountability	Participation in politics, freedom of expression, freedom of association, and free media
Political stability	Likelihood that the government will be destabilized or overthrown
Government effectiveness	The quality of public services, civil service, independence from political pressures
Regulatory quality	Implementation of sound policies and regulations

Table 3 continued

Variable	Definition and Sources
Rule of law	The quality of contract enforcement, the police, and the courts, likelihood of crime and violence
Control of corruption	The extent to which public power is exercised for private gain
KKZ	The Average of the Governance Indicators

The Multilevel Framework

Without subscripting for individual right-hand variables, the classical regression model is given by:

$$y_{ij} = \alpha_j + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \mathbf{X}_{ij}\beta + \epsilon_{ij} \tag{2}$$

where y_{ij} is life satisfaction score for individual i in country j. In its present form this model assumes a single intercept α_j and that $\beta_{1j} = \beta_1$ and $\beta_{2j} = \beta_2$ across all j. Both assumptions need to be relaxed.

In a multilevel model α_j is not constant across countries:

$$\alpha_j = \gamma_0 + \gamma_1 Z_{1j} + \mathbf{Z}_j\gamma + \zeta_j \tag{3}$$

where $\mathbf{Z}_j$ is a vector of country-level predictor variables (excluding Z_{1j}). If Z_{1j} is a country-level variable, say `PCGDP`, that is suspected to have interactive effect with a person-level variable, say personal income, insertion of (3) into (2) will produce the random intercept model to be estimated:

$$y_{ij} = (\gamma_0 + \zeta_j) + \gamma_1 Z_{1j} + \mathbf{Z}_j\gamma + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \mathbf{X}_{ij}\beta + \epsilon_{ij} \tag{4}$$

The country specific intercept is given by $(\gamma_0 + \zeta_j)$.

In addition, slopes for X_{1ij} and X_{2ij} are likely to be much different across countries. For simplicity, assume that β_{1j} and β_{2j} vary by country depending only on Z_{1j} and Z_{2j}, respectively.

$$\beta_{1j} = \lambda_{01} + \lambda_{11}Z_{1j} + u_{1j} \tag{5}$$

$$\beta_{2j} = \lambda_{02} + \lambda_{12} Z_{2j} + u_{2j} \tag{6}$$

Preliminary analysis indicates that letting the two slopes β_{1j} and β_{1j} vary in one equation introduces instability, and the maximum likelihood estimation does not converge. Hence, we need to introduce (5) and (6) separately into (4) to avoid instability and collinearity and rearrange:

$$\begin{aligned} y_{ij} &= (\gamma_0 + \zeta_j) + \gamma_1 Z_{1j} + \mathbf{Z}_j\gamma + \lambda_{01} X_{1ij} + \lambda_{11} X_{1ij} Z_{1j} + \beta_{2j} X_{2ij} + \mathbf{X}_{ij}\beta \\ &\quad + (\epsilon_{ij} + u_{1j} X_{1ij}) \\ \beta_{2j} &= \beta_2 \end{aligned} \tag{7}$$

$$\begin{aligned} y_{ij} &= (\gamma_0 + \zeta_j) + \gamma_1 Z_{1j} + \ \mathbf{Z}_j\gamma + \lambda_{02} X_{2ij} + \lambda_{12} X_{2ij} Z_{2j} + \beta_{1j} X_{1ij} + \mathbf{X}_{ij}\beta \\ &\quad + (\epsilon_{ij} + u_{2j} X_{2ij}) \\ \beta_{1j} &= \beta_1 \end{aligned} \tag{8}$$

λ_{01} and λ_{02} are random slope coefficients. λ_{11} and λ_{12} are cross-level interaction random slope coefficients.

Results and Discussion

Usually we think of religion as contributing to health and overall wellbeing: religion make sense of life, brings motivation and explanation. But we often do not realize that religion also brings negative affect, for instance, by reinforcing a belief that suffering and disease is a punishment for sin. There are also problems when people rely on miracles as an alternative to medicine and physics (Koenig et al., 2001). This paper uses multiple measures of religiosity as discussed above. Let's examine the relationships among them and life satisfaction Polychoric correlation matrix of `life satisfaction` and religiosity variables is shown in Table 4[3]. Note that the correlations of life satisfaction with most

[3]Correlations between `atheist` and `religious person` are omitted from this correlation matrix as they are almost one. Note that polychoric correlation matrix is suitable for ordinal variables, while for

of the religiosity variables are negative. While these are only bivariate correlations, note that the relationship between religiosity and life satisfaction is not simply positive but rather complex as hinted at in many papers Koenig et al. (2001).

Table 4: Polychoric Correlation Matrix

	life satisfaction	attend religious services	belong to religious denomination	time with people at church	believe in god	god important in life	belong to religious organization
life satisfaction	1.00						
attend religious services	-0.01	1.00					
belong to religious denomination	-0.01	0.68	1.00				
time with people at church	-0.02	0.70	0.57	1.00			
believe in god	-0.04	0.72	0.75	0.63	1.00		
god important in life	-0.03	0.59	0.52	0.54	0.78	1.00	
belong to religious organization	0.05	0.50	0.60	0.59	0.38	0.37	1.00
atheist	0.00	-0.62	-0.67	-0.50	-0.82	-0.58	-0.39
religious	-0.02	0.62	0.70	0.52	0.87	0.63	0.38

Negative correlations of many measures of religiosity with life satisfaction are further explored using correspondence analysis. Correspondence analysis offers a geometric representation of a two-way frequency table. Roughly speaking,the closer the two categories are in the graph the more they are related. Figure 1 shows `life satisfaction` and `importance of god`.

Respondents who said that god is very important in their lives (10 on 1-10 scale) tend to be either very dissatisfied or very satisfied with their lives (1 or 10 on 1-10 scale). These data points are marked with ellipse in right top corner. A careful inspection of other data points also reveals contradictory relationship between the two variables. Figure 2 shows the relationship between `life satisfaction` and `religion important in life`.

A similar pattern emerges in this figure. People who claim that religion is very important in their lives (4 on 1-4 scale) are either very satisfied or very dissatisfied with their lives. On the other hand, people who think that religion is not important (1 or 2 on 1-4 scale) tend to be quite satisfied with their lives (7 or 8 on 1-10 scale).

binary variables a suitable choice is tetrachoric correlation matrix. Since we have a mix of ordinal and binary variables a polychoric correlations were used to display all correlations, but tetrachoric correlations (not reported) of binary variables only are not substantively different.

Figure 1: Correspondence Analysis Biplot of `Life Satisfaction` and `Importance of God`

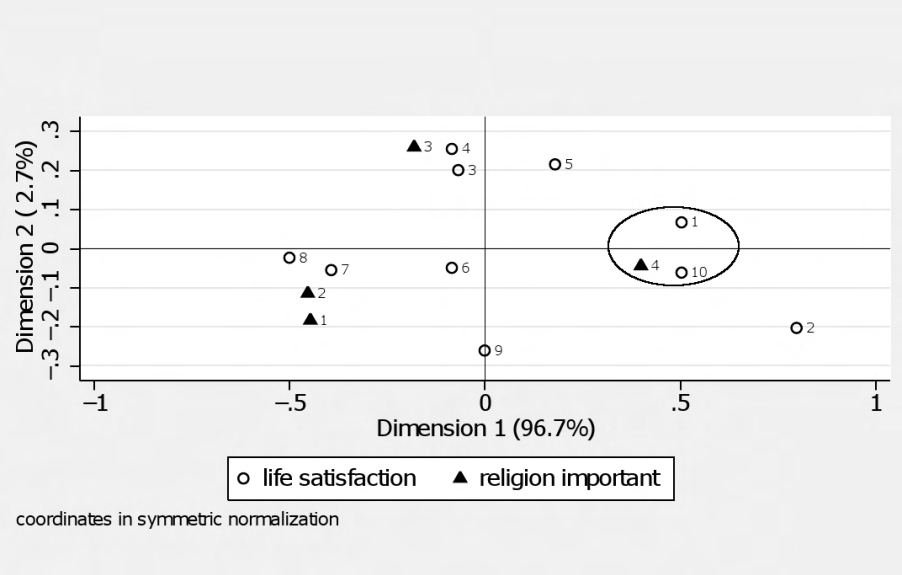

Figure 2: Correspondence Analysis Biplot of `Life Satisfaction` and `Religion Important in Life`

The above measures pertain to social religiosity. But even in case of social religiosity (church attendance) the relationship is two dimensional. The most frequent churchgoers (4 on 1-4 scale) tend to be either very satisfied with their lives or very dissatisfied (1 or 10 on 1-10 scale) as shown in Figure 3.

Figure 3: Correspondence Analysis Biplot of `Life Satisfaction` and `Time with People at Church`

A similar pattern can be seen in the following histograms. Figure 4 shows `life satisfaction` for people who believe in god and people who do not believe in god. Those who believe in god are less satisfied with their lives, and the biggest difference between life satisfaction distributions for the two categories is for most dissatisfied people. There are about 5 % more very dissatisfied people among those who believe in god versus those who do not believe in god. This is a big difference, there are few people very dissatisfied with their lives.

Figure 5 shows distributions of life satisfaction for people who are religious , not religious and convinced atheists. Although, on average, religious people are more satisfied than not religious and convinced atheists, there are more very dissatisfied and fewer quite satisfied religious people than not religious or convinced atheists.

As these bivariate graphs demonstrate a multivariate analysis is needed in order to tease out who are the people or countries that benefit from the religion and whom religion makes unhappy.

Regression results follow. As there are many measures of religiosity and many possible interactions to test, following tables show only the most interesting results. Table 5

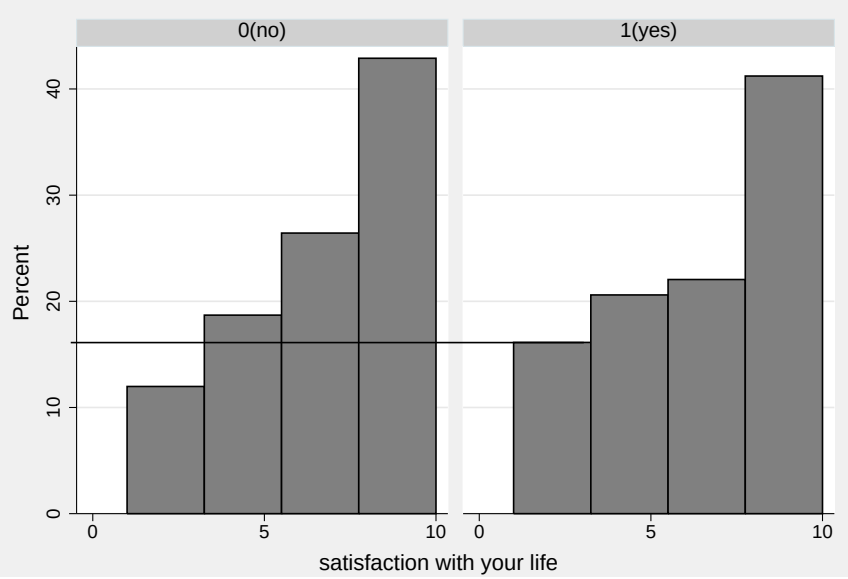

Figure 4: Histogram of `Life Satisfaction` for People who Believe in God and People who do Not Believe in God

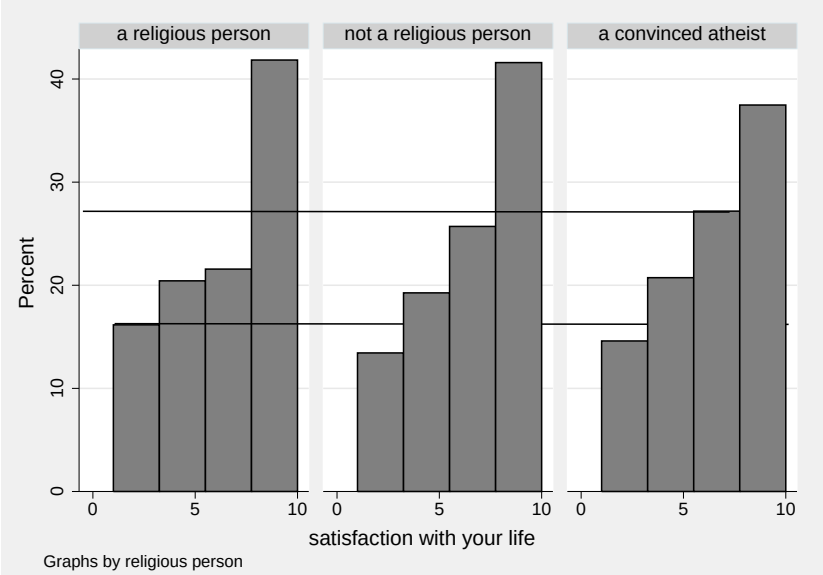

Figure 5: Histogram of `Life Satisfaction` for People who are Religious , Not Religious and Convinced Atheists

shows that social religiosity measures such as `attend religious services`, `belong to religious organization` and `time with people at church` are positive and significant in specification (A1), but also when controlling for individual religiosity measures. On the other hand, individual religiosity measures tend to have negative influence on

life satisfaction. `Believe in god` is negative and significant in both specifications (A2) and (A3) and `belong to religious denomination` is negative in (A2) and (A3) and significant in (A3) `religious` is insignificant when controlling for social religiosity in (A3).

Table 5: Life Satisfaction, Religiosity and Social Capital: Multilevel Estimates

	(A1)	(A2)	(A3)
religious		0.0912***	0.0214
belong to religious denominantion		-0.0412	-0.122***
religion important in life		0.104***	0.0385**
believe in god		-0.236***	-0.209***
god important in life		0.0533***	0.0482***
attend religious services	0.0543***		0.0356***
belong to religious organization	0.114***		0.102***
time with people at church	0.0721***		0.0592***
kkz	-0.0971	-0.0498	0.0319
gdp	0.967*	1.209**	1.044*
gdp^2	-0.115	-0.169*	-0.135
misery	-1.735**	-1.459**	-1.785**
life expectancy	0.352*	0.280	0.283
age	-0.0669***	-0.0662***	-0.0700***
age^2	0.000672***	0.000657***	0.000691***
income	0.161***	0.141***	0.157***
education	0.0301***	0.0305***	0.0391***
married	0.353***	0.345***	0.343***
divorced	-0.172***	-0.194***	-0.193***
unemployed	-0.550***	-0.665***	-0.573***
Constant	3.354**	3.755***	3.753***
Observations	46107	62191	36460
Number of groups	47	56	42

*** p<0.01, ** p<0.05, * p<0.1

Table 6 shows cross-level interactions, that is interactions of person-level religiosity variables with their country-level means. These interactions test whether religiosity makes people happier in religious nations. Table 6 focuses on individual religiosity, as these measures appear to be most contradictory (for some people individual religiosity is associated with more satisfaction whereas for other people individual religiosity brings about unhappiness).

All individual religiosity indicators are negative, although not all are significant. But all interactions with country level means are significant at .001 level of significance and positive. Note a substantively big coefficient (0.671) on interaction of `believe in god` with its country mean. People who believe in god are less happy that those who do not believe in god, but if they live in countries where many people believe in god they are much happier than non-believers. This result reveals that the social setting impacts

Table 6: Life Satisfaction, Religiosity and Cross-Level Interactions: Multilevel Estimates

	(B1)	(B2)	(B3)
religion important in life	-0.109		
religion important in life∗mean	0.102***		
believe in god		-0.278*	
believe in god∗mean		0.671***	
god important in life			-0.0175
god important in life∗mean			0.0131***
kkz	-0.113	0.00400	0.225
gdp	1.144**	1.029**	0.754*
gdp^2	-0.151*	-0.135	-0.0844
misery	-1.404**	-1.702***	-1.261**
life expectancy	0.449**	0.158	0.182
age	-0.0660***	-0.0664***	-0.0651***
age^2	0.000666***	0.000674***	0.000655***
income	0.147***	0.139***	0.147***
education	0.0293***	0.0263***	0.0309***
married	0.351***	0.371***	0.352***
divorced	-0.173***	-0.166***	-0.178***
unemployed	-0.657***	-0.658***	-0.651***
Constant	2.470*	5.023***	4.483***
Observations	74117	67586	74024
Number of groups	60	57	60

*** p<0.01, ** p<0.05, * p<0.1

relationship between belief in god and happiness.

It remains for the future research to determine whether it is due to social desirability or other mechanism. I also experimented with cross-level interactions of religiosity measures and gross domestic product, inflation, and unemployment but did not find strong relationships there.

Table 7 has two panels with models for poor countries and rich countries. The cutoff is set at $10,000 of per capita gross domestic product. These results focus on the effect of being unemployed on life satisfaction. It is well known from the literature that the unemployed individuals are less happy than employed people, but this relationship may be different for poor and rich countries.

Table 7 shows that unemployment makes people much more miserable in rich countries. One explanation is that there is a greater social stigma associated with unemployment in rich countries. Moreover, religiosity alleviates negative effect of unemployment on happiness in rich countries but it does not help in poor countries.

Last two Tables focus on type of occupation. Occupational categories are defined as professional, manual or others. Table 8 shows interactions of manual worker dummy vari-

Table 7: Life Satisfaction and Religiosity in Poor and Rich Countries : Multilevel Estimates

	rich countries			poor countries		
	(C1)	(C2)	(C3)	(C4)	(C5)	(C6)
belong to religious organization	0.277***			0.321***		
belong to religious organization∗unemployed	0.245*			0.0869		
belong to religious denomination		0.158***			0.168*	
belong to religious denomination∗unemployed		0.277***			-0.0415	
religious			0.225***			0.285***
religious∗unemployed			0.223**			0.0817
kkz	0.241	0.415	0.402	-0.0841	0.146	-0.0283
gdp	0.862	0.907	0.877	-2.863	0.415	0.254
gdp^2	-0.0940	-0.104	-0.107	3.666	0.653	0.933
life expectancy	-0.406	-0.572	-0.473	0.522***	0.171	0.228
age	-0.0571***	-0.0587***	-0.0593***	-0.0665***	-0.0612***	-0.0588***
age^2	0.000588***	0.000622***	0.000627***	0.000652***	0.000594***	0.000568***
income	0.101***	0.105***	0.102***	0.245***	0.198***	0.197***
education	0.0226***	0.0270***	0.0291***	0.0333***	0.0241***	0.0261***
married	0.490***	0.472***	0.437***	0.212***	0.223***	0.218***
divorced	-0.116***	-0.132***	-0.162***	-0.255***	-0.250***	-0.251***
unemployed	-0.961***	-1.050***	-1.053***	-0.502***	-0.446***	-0.536***
Constant	9.041**	9.988***	9.398**	2.595**	4.562***	3.986***
Observations	28192	33900	30421	35010	55425	54269
Number of groups	26	31	29	31	42	43

*** p<0.01, ** p<0.05,
* p<0.1

able with measures of religiosity. Surprisingly, religiosity makes manual workers unhappy. This result is consistently negative for different measures of religiosity. Also, keep in mind that all specifications control for education and personal income.

Table 9 shows interactions of professional worker dummy variable with measures of religiosity. Results are opposite. Religion does make professional workers happier. More research is needed to find out why this differential pattern by occupation type emerges.

Concluding, this paper formally tests popular hypothesis that the effect of religiosity is different for different people and different countries using multilevel modeling. It also demonstrates using correspondence analysis that there are two dimensions in the relationship between religiosity and ife satisfaction. Positive dimension is stronger. On the whole religiosity makes people happier as demonstrated by the majority of the research to date. However, there is also a clear negative dimension: some forms of religiosity (especially individual religiosity) make people unhappy. Most of the happiness that religiosity brings about seem to come from the social setting it offers, it satisfies the so called "need to belong" that is one of the most fundamental conditions for human happiness.

Table 8: Life Satisfaction and Religiosity; Manual Workers: Multilevel Estimates

	(D1)	(D2)	(D3)	(D4)	(D5)	(D6)
belong to religious organization	0.351***					
belong to religious organization∗manual	-0.123***					
belong to religious denomination		0.217***				
belong to religious denomination∗manual		-0.167***				
religious			0.331***			
religious∗manual			-0.171***			
religion important in life				0.195***		
religion important in life∗manual				-0.0478***		
time with people at church					0.122***	
time with people at church∗manual					-0.0401***	
believe in god						0.296***
believe in god∗manual						-0.176***
kkz	0.381	0.304	0.187	0.157	0.243	0.314
gdp	0.473	0.717	0.961**	0.990**	0.875**	0.884**
gdp^2	-0.0559	-0.0916	-0.129	-0.126	-0.110	-0.117
life expectancy	0.365***	0.160	0.182	0.240*	0.142	0.0735
age	-0.0614***	-0.0610***	-0.0612***	-0.0597***	-0.0528***	-0.0603***
age^2	0.000641***	0.000633***	0.000631***	0.000613***	0.000547***	0.000624***
income	0.185***	0.163***	0.164***	0.168***	0.177***	0.162***
education	0.0390***	0.0252***	0.0281***	0.0290***	0.0395***	0.0261***
married	0.344***	0.338***	0.321***	0.331***	0.312***	0.344***
divorced	-0.161***	-0.175***	-0.181***	-0.173***	-0.163***	-0.168***
Constant	3.216***	4.699***	4.330***	3.460***	4.272***	5.076***
Observations	54961	81232	77836	82419	60269	76258
Number of groups	57	73	73	74	63	71

*** p<0.01, ** p<0.05, * p<0.1

Religiosity makes people happier in religious nations. This is quite important result revealing that it is not religiosity per se, but rather a social aspect of religion that contributes to happiness. More research is needed to find out the exact mechanism.

Table 9: Life Satisfaction and Religiosity; Professional Workers :Multilevel Estimates

	(E1)	(E2)	(E3)	(E4)	(E5)	(E6)
belong to religious organization	0.284***					
belong to religious organization∗professional	0.122**					
belong to religious denominantion		0.132**				
belong to religious denominantion∗professional		0.120***				
religious			0.244***			
religious∗professional			0.136***			
religion important in life				0.173***		
religion important in life∗professional				0.0325***		
time with people at church					0.0964***	
time with people at church∗professional					0.0631***	
believe in god						0.207***
believe in god∗professional						0.116***
kkz	0.373	0.300	0.185	0.154	0.232	0.312
gdp	0.485	0.720	0.963**	0.996**	0.892**	0.884**
gdp^2	-0.0577	-0.0920	-0.129	-0.127	-0.113	-0.117
life expectancy	0.364***	0.158	0.181	0.238*	0.142	0.0687
age	-0.0619***	-0.0636***	-0.0637***	-0.0624***	-0.0553***	-0.0632***
age^2	0.000645***	0.000659***	0.000655***	0.000639***	0.000571***	0.000653***
income	0.185***	0.164***	0.165***	0.168***	0.176***	0.162***
education	0.0386***	0.0255***	0.0277***	0.0296***	0.0348***	0.0270***
married	0.343***	0.338***	0.321***	0.331***	0.308***	0.344***
divorced	-0.160***	-0.173***	-0.179***	-0.171***	-0.164***	-0.165***
Constant	3.227***	4.769***	4.392***	3.524***	4.348***	5.168***
Observations	54961	81232	77836	82419	60269	76258
Number of groups	57	73	73	74	63	71

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* APPENDIX 1

COUNTRIES IN WORLD VALUES SURVEY, WITH YEAR OF SURVEY AND SAMPLE SIZE

Country	Year	Sample	Country	Year	Sample
Albania	2002	1000	Jordan	2001	1223
Algeria	2002	1282	Kyrgyzstan	2003	1043
Argentina	1999	1280	Latvia	1999	1013
Armenia	1997	2000	Lithuania	1999	1018
Australia	1995	2048	Luxembourg	1999	1211
Austria	1999	1522	Macedonia, Republic Of	2001	1055
Azerbaijan	1997	2002	Malta	1999	1002
Bangladesh	2002	1500	Mexico	2000	1535
Belarus	2000	1000	Morocco	2001	2264
Belgium	1999	1912	Netherlands	1999	1003
Bosnia And Herzegovina	2001	1200	New Zealand	1998	1201
Brazil	1997	1149	Nigeria	2000	2022
Bulgaria	1999	1000	Pakistan	2001	2000
Canada	2000	1931	Peru	2001	1501
Chile	2000	1200	Philippines	2001	1200
China	2001	1000	Poland	1999	1095
Colombia	1998	2996	Portugal	1999	1000
Croatia	1999	1003	Puerto Rico	2001	720
Czech Republic	1999	1908	Republic Of Korea	2001	1200
Denmark	1999	1023	Republic Of Moldova	2002	1008
Dominican Republic	1996	417	Romania	1999	1146
Egypt	2000	3000	Russian Federation	1999	2500
Estonia	1999	1005	Saudi Arabia	2003	1502
Finland	2000	1038	Serbia And Montenegro	2001	2260
France	1999	1615	Singapore	2002	1512
Georgia	1996	2008	Slovakia	1999	1331
Germany	1999	2036	Slovenia	1999	1006
Great Britain	1999	1000	South Africa	2001	3000
Greece	1999	1142	Spain	2000	1209
Hungary	1999	1000	Sweden	1999	1015
Iceland	1999	968	Switzerland	1996	1212
India	2001	2002	Tanzania, United Republic Of	2001	1171
Indonesia	2001	1004	Turkey	2001	4607
Iran (Islamic Republic Of)	2000	2532	Uganda	2001	1002
Iraq	2004	2325	Ukraine	1999	1195
Ireland	1999	1012	United States	1999	1200
Israel	2001	1199	Uruguay	1996	1000
Italy	1999	2000	Venezuela	2000	1200
Japan	2000	1362	Viet Nam	2001	1000
			Zimbabwe	2001	1002

* APPENDIX 2
DESCRIPTION OF WVS

As noted at `http://www.icpsr.umich.edu/cocoon/ICPSR/STUDY/04531.xml`, which is quoted in the next three paragraphs, the

> World and European Values Surveys series were designed to enable a cross-national, cross-cultural comparison of values and norms on a wide variety of topics and to monitor changes in values and attitudes across the globe. They were carried out in 1981-1984, 1990-1993, 1995-1997, and 1999-2004, but now have been integrated into one dataset to facilitate time series analysis.
>
> The surveys provide data from representative national samples of the publics of approximately 81 societies (covering 60 countries) that contain 85 percent of the world's population and cover a full range of variation, from societies with per capita incomes below 300 dollars per year, to societies with per capita incomes of more than 35,000 dollars per year, from long-established democracies to authoritarian states, and from societies with market economies to societies that are in the process of emerging from state-run economies. The surveys cover societies that were historically shaped by a wide variety of religious and cultural traditions, from Christian to Islamic to Confucian to Hindu. The societies covered range from those whose culture emphasizes social conformity and group obligations to societies in which the main emphasis is on human emancipation and self-expression. Broad topics covered in the integrated file include perception of life, family, work, traditional values, personal finances, religion and morale, the economy, politics and society, the environment, allocation of resources, contemporary social issues, national identity, and technology and its impact on society.
>
> Specifically, respondents were asked whether the following acts were ever jus-

tifiable: suicide, cheating on taxes, lying, euthanasia, divorce, and abortion. Respondents were also asked about the groups and associations they belonged to, which ones they worked for voluntarily, the ethnic group(s) they would not want as neighbors, their general state of health, and whether they felt they had free choice and control over their lives. A wide range of items was included on the meaning and purpose of life, such as respondents' views on the value of scientific advances, the demarcation of good and evil, and religious behavior and beliefs. Respondents were also queried about their attitudes toward morality, politics, sexual freedom, marriage, single parenting, child-rearing, and the importance of work, family, politics, and religion in their lives. Questions relating to work included what financial and social benefits were most important to them in a job, how much pride they took in their work, if they were happy with their current position, and their views on owner/state/employee management of business. Questions pertaining to the stability of the world economy and whether respondents were happy with their financial situation were also asked. Respondents' opinions on various forms of political action, the most important aims for their countries, confidence in various civil and governmental institutions, and whether they would fight in a war for their country were also elicited. Demographic information includes family income, number of people residing in the home, size of locality, region of residence, occupation of the head of household, and the respondent's age, sex, occupation, education, religion, religiosity, political party and union membership, and left-right political self-placement.

Of particular interest to happiness researchers is one simple World Values Survey question: 'All things considered, how satisfied are you with your life as a whole these days ?' Respondents were asked to answer this question on a scale from 1 to 10, where 10 is the most satisfied. Their responses have been used as a dependent variable in individual investigations of happiness and mean responses have typically become the dependent

variable in cross-national analyses.

The dependent variable, life satisfaction, is ordinal variable. It is natural then to use ordinal logistic/probit regression, and it is a practice adopted by most of the economic literature (e.g., Alesina et al. 2004; Di Tella et al. 2001b; Di Tella et al. 2001a; van Praag et al. 2003). But it turns out that discrete choice modeling of life satisfaction is of little importance: most of the psychological literature uses Ordinary Least Squares (OLS) and hence assumes cardinality of life satisfaction self-reported measure. Comparison of OLS and ordinal logit regressions in fact finds differences to be negligible (Ferrer-i-Carbonell and Frijters, 2004). The reason may be that there are ten categories on the dependent variable, and hence it approaches continuity. On the other hand, robustness of the results may be enhanced by use of individual fixed effects or control for time invariant personality traits (Ferrer-i-Carbonell and Frijters, 2004).

The dependent variable is composed of individual responses to the WVS question *All things considered, how satisfied are you with your life as a whole these days?* Respondents were asked to check where they were on an ordinal scale ranging from *1(low) to 10(high).* Normally, an ordinal dependent variable would be problematic, but economists now view utility as a cardinal concept (van Praag, 2005), and prior investigations have shown that there is little difference in analyses of the WVS data whether continuous or ordinal response modeling strategies are used (Ferrer-i-Carbonell and Frijters, 2004). Because of the other attendant difficulties of using multilevel data I therefore choose to treat life satisfaction as if the responses are cardinal. As van Praag (2005, p.198) remarks:

> When we have two alternative situations x_1 , x_2 and x_3 , in most cases individuals will not only be able to say that they prefer x_2 to x_1 and x_3 to x_2, that is $W(x_1) < W(x_2) < W(x_3)$, but they are also able to say whether the improvement going from x_1 to x_2 is more or less than the improvement associated with going from x_2 to x_3. Individuals are able to compare utility differences. But this is just what is necessary and sufficient for having a cardinal utility function.

* APPENDIX 3

FREQUENCY TABLES OF RELIGIOSITY MEASURES

Table 11: attend religious services

Item	Number	Per cent
1(never/practically never)	25,296	23
2(less often)	9,387	9
3(once a year)	7,594	7
4(other specific holy days)	2,514	2
5(only on special holy days)	17,728	16
6(once a month)	12,494	12
7(once a week)	19,764	18
8(more than once a week)	13,621	13
Total	108,398	100

Table 12: belong to religious denomination

Item	Number	Per cent
no	20,148	19
yes	86,926	81
Total	107,074	100

Table 13: time with people at church

Item	Number	Per cent
not at all	34,162	43
only a few times a year	13,356	17
once or twice a month	11,339	14
weekly	20,271	26
Total	79,128	100

q

Table 14: believe in: god

Item	Number	Per cent
0(no)	12,416	13
1(yes)	86,909	87
Total	99,325	100

Table 15: importance of god

Item	Number	Per cent
1(not at all)	9,285	9
2	3,555	3
3	3,937	4
4	2,888	3
5	7,519	7
6	5,175	5
7	6,050	6
8	8,067	8
9	8,463	8
10	52,385	49
Total	107,324	100

Table 16: belong to religious organization

Item	Number	Per cent
0(not mentioned)	59,867	80
1(belong)	14,904	20
Total	74,771	100

Table 17: religious

Item	Number	Per cent
0(no)	26,379	26
1(yes)	74,973	74
Total	101,352	100