27^{th} World Congress of Political Science	Buenos Aires, Argentina	15-19 July 2023

The Social Dynamics of Religiosity Decline

Jakson Alves de Aquino

Federal University of Ceará — Brazil

https://orcid.org/0000-0003-2522-8573

jaa@ufc.br

Abstract

What is the causal sequence resulting in declining religiosity? Analyzing World Values Survey (WVS) data, previous researchers have demonstrated that economic development makes people less worried about survival and freer to express their sentiments and beliefs and even dismiss religion as the main source to look for the meaning of life. More precisely, in the most economically developed societies, emancipative values become widespread and have important effects in many social arenas, including higher demand for democracy and the replacement of religion as a source of happiness. In this paper, I consider that are more religious the individuals who attend religious services frequently, consider religion important in life, and define themselves as religious persons. Using aggregated WVS 1981-2022 trend data by country/wave to fit lagged regressions (Granger causality tests), I confirm that GDP per capita explains emancipative values, which, in turn, explain religiosity. Moreover, the lagged regressions — including logged GDP and emancipative values as controls — show that people attribute less importance to religion before decreasing their attendance to religious services. This finding is the main contribution of this paper since I did not find it in the reviewed literature. Finally, multilevel regressions also confirm that cohort effect on religiosity is stronger than the effect of age, that is, in countries where religiosity is declining, younger people are less religious and it is not expected that they will become much more religious later in life, unless deep and lengthy economic crises undermine their well-being. In summary, economic prosperity frees people from many restrictions and allows them to develop new values which partially clash with the teachings of their religions. Mostly for young people, the conflict of values results in seeing religion as less important and, ultimately, deciding not to go to church.

Introduction

The human brain evolved in such a way that it seems more intuitive for most individuals to believe in a world populated with spirits and gods than to use scientific knowledge to explain feelings of belonging and the perception of meaning in the world. In spite of this, religiosity is not a natural and unavoidable feature of human personality, and it is in a process of decline in most Western societies.

What is the causal sequence that leads to religiosity decline? Many authors have used World Values Survey data to describe and explain cultural change in the last decades. Recently, Inglehart (2021) has investigated the religiosity decline and has shown that younger generations, mostly in developed and democratic countries, are abandoning the religiosity of their parents. Increasing material security is a social context that makes people feel less dependent on their community and freer to behave in diverse ways. The traditional repression of sexuality typical of the most successful religions of the last centuries is no longer seen as necessary and many individuals are questioning the religious belief system that still predominates in most countries.

My goal in this paper is to contribute to a better understanding of the process of religiosity decline. Specifically, through Granger causality tests, I present empirical evidence that people keep going to church for a while after their feeling of how religion is important is no longer strong.

In the next sections, I review the literature on the origins and psychological features of religiosity, and on the social dynamics of religiosity change, including discussions on secularization and modernization. Next, I present some hypotheses to be tested with World Values Survey data. The results are followed by a brief concluding section.

Origins and psychology of religiosity

Religion is a system of beliefs about a supernatural world and rituals to interact with this world that are shared by a community of individuals. In more evolved societies, the community may maintain a church or other structure for holding services and some people might be in charge of organizing and leading the services (Turner et al., 2018). In contrast with religion, spiritual beliefs are not necessarily institutionalized. Individuals might create their own explanations for their intuitions and, as long as these explanations include supernatural beings and forces, they may be considered spiritual (van Elk & Aleman, 2017).

Studies from anthropology, primatology, neurosciences, and psychology indicate that religiosity is not an innate characteristic of human beings. Although present in all known cultures, religion as a social phenomenon and religiosity as an individual phenomenon would not be the direct result of natural selection processes. Probably, our last common ancestor with the other apes had the characteristics that are shared by all apes today. Comparing the behavior, cultural sophistication, language skills, expression of emotions and physical characteristics of current humans with other existing anthropoids (chimpanzees, bonobos, gorillas, and orangutans) allows us to infer what the first hominids would have been like. Evidence indicates that our last common ancestor with present-day anthropoids lived in the transitional regions between tropical forests and savannas. Both hunter-gatherer peoples described by ethnographers and bonobos and chimpanzees studied by primatologists live in communities that have up to two hundred individuals but which, rarely, meet in the same place at the same time. Individuals are distributed in small groups of hunters and gatherers that explore the same territory. Meetings between groups from the same community are friendly, but there is a risk of conflict when groups from different communities meet. Our ancestors were individualists (they did not have a herd instinct), but they did have a sense of community, that is, a sense of belonging to a larger community than the small group with which they stay most of the time (Turner et al., 2018). The weak ties resulting

from a sense of community have great potential to serve as a basis for large-scale cooperation. Weak ties require less time and attention to be maintained and allow greater independence for individuals. People manage to maintain only a few strong ties, but they can deal with a large community of weak ties, a prerequisite for the development of complex societies.

Life in the savanna means abandoning the protection of trees with the consequent need to evolve new defense mechanisms. The main physical change—and the oldest one—was the evolution of bipedalism. But our ancestors also needed to become more cooperative, and this was achieved through emotional and cognitive evolution. Probably the Darwinian selection process did not create new structures in the brain because it is very rare for a mutation to produce a positive result in a complex structure like the brain. The most likely is that there have been increases in existing areas, and the comparison with the brains of other anthropoids shows that not only our neocortex is proportionally larger (14 times), but also areas responsible for emotions are larger (2 to 4 times).

According to Turner et al. (2018), mammals have 4 basic emotions: assertion-anger, aversion-fear, disappointment-sadness, and most importantly, satisfaction-happiness. Existing anthropoids, and even some species of apes, are already capable of manifesting some sense of justice, such as anger at receiving unequal treatment, but humans seem to be the only ones to have combined basic emotions to the point of feeling shame, guilt, and remorse, emotions that induce individuals to punish themselves when they do not meet community expectations (Turner et al., 2018). When individuals self-punish, the need for punishment by others becomes less frequent, and, therefore, the community becomes not only more cooperative but also less confrontational. Guilt and remorse are emotions that cause discomfort, but the evolution of positive emotions — such as gratitude — may also have played an important role in human evolution (Aquino, 2011).

Due to their intelligence and capacity for cooperation, human beings, even in less technologically developed societies, are at the top of the food chain. The greatest risk to a human being's survival is another human being and a human being's greatest opportunity for success is the association with other human beings. This makes being able to infer other people's intentions highly strategic, and evolutionary psychologists argue that the human brain evolved to perform this task in a highly efficient way (Barkow et al., 1992). Indeed, specific areas of the brain are activated when individuals think about what is on other people's minds or interpret facial expressions, and the same areas are activated when individuals think about spirits or gods (Grafman et al., 2020; Kapogiannis et al., 2009; van Elk & Aleman, 2017). Religiosity, therefore, has no basis of its own in the human brain and probably emerged as a result of the evolution of human cognitive and emotional capacities.

Further evidence that religiosity did not evolve independently comes from psychology. For decades, psychologists have repeatedly confirmed that human personality traits largely fall into the Big Five: Agreeableness, Conscientiousness, Neuroticism, Openness to Experience, and Extraversion. Saroglou (2010) found that three dimensions of religion—religiosity, spirituality, and fundamentalism—are correlated with some of these factors and do not constitute a distinct dimension of personality: Agreableness and Conscientiousness are positively correlated with the three religious dimensions, while Openness to Experience is positively correlated with spirituality and negatively correlated with fundamentalism.[1] The evidence, therefore, indicates that, from an individual point of view, religiosity can be seen as a cultural adaptation to personality traits and not as a basic dimension of personality. Religiosity would be something closer to values than to personality traits.

Our brain is constantly classifying the signals it receives as internal (thoughts and memories, for example) or external (received, for example, by the senses of sight, hearing, touch, smell, and taste). Occasionally, however, this distinction fails and the person feels that events produced

[1]It is interesting to note that femininity, an personality dimension independent of the Bif Five, is correlated with religiousness and that religious people conceptualize God with a personality similar to their own (Saroglou, 2010).

by his own mind are external (van Elk & Aleman, 2017). Possibly, the feeling of belonging to a community, already present in our last common ancestor with anthropoids, leads the individual to perceive himself as an integral part of the universe as a whole and would be one of the bases of religion (Grafman et al., 2020; Turner et al., 2018; Urgesi et al., 2010). Whether individuals will consider these experiences to be mystical and transcendent, evidencing the existence of a supernatural world populated by spirits and gods depends on cultural learning (Turner et al., 2018; van Elk & Aleman, 2017).

Rituals involving collective interactions can transform the diffuse sense of belonging to a community into strong emotions that lead individuals to clearly feel the presence of a greater whole of which they are a part. As euphoria is shared by all ritual participants, everyone feels part of the same collective, which increases interpersonal trust and facilitates cooperation to solve community problems (Turner et al., 2018). Religion is a collective phenomenon in which individuals who feel belonging to a community perform rituals and share beliefs that give meaning to what they see and feel. Simple societies of hunter-gatherer peoples have less need to coordinate complex actions and usually develop simpler beliefs, such as that their dead ancestors are still alive in another world, and it is possible to establish communication with them through special rituals. Beliefs in powerful gods capable of punishing evildoers are more common in more complex societies, with agricultural production and urbanized regions, which need large-scale cooperation, for example, for tax collection and military organization (Botero et al., 2014; Jackson et al., 2021; Turner et al., 2018).

Another role played by religion and its rituals is to alleviate the anxiety caused by the awareness of uncertainties about the future arising from the greater intelligence and memory of humans (Norenzayan & Gervais, 2013; Turner et al., 2018; White et al., 2021). Religion would also have the role of restoring a sense of justice: in personal relationships, if someone does something wrong and goes unpunished, the belief that they will pay for their wrongdoings in another life is comforting. With agriculture, inequality increases. It becomes necessary for a Big Man to concentrate and redistribute wealth. In this context, religion legitimizes inequality and feeds the hope of justice in the future (Turner et al., 2018).

People from society who keep livestock, are politically complex, and have less access to food and water, believe more in moralizing gods. For societies that are among the 85% with greater availability of food and water, the belief in moralizing gods is greater when environmental variations are more unpredictable (droughts, for example). For chronically resource-poor societies, it is environmental stability that is associated with greater belief in moralizing gods. A shared belief in moralizing gods can contribute to coping with a difficult environment by reducing anxiety and increasing appeal to cosmic authority (White et al., 2021).

Secularization and religiosity decline

Individual actors feel pressure for structural and cultural innovation and react rationally to these pressures, creating a type of cultural selection that is teleological, in contrast to biological selection, which is blind and opportunistic. In some cases, people manage to plan and implement new institutions that allow them to overcome the problem. When this does not happen, the society may disintegrate or be conquered by another. The predominant religions in the world today are representatives of institutional solutions to problems faced in the past. One of the problems faced was the erosion of the legitimacy of political systems due to the increase in inequality arising from the centralization of power that accompanied agriculture and urbanization. Religions that were more successful in legitimizing these inequalities and in motivating citizens to go to war were more likely to succeed. A highly moralized belief system can be used to direct individuals' emotions against members of other institutional systems (Turner et al., 2018). These belief systems evolved and consolidated during the last millennia with church and State

evolving together. Only recently this symbiosis began to be seen by some as dysfunctional.

Casanova (1994) sees the process of separation between State and Church as an irresistible tendency of the modernization process. A consequence of this is that religion becomes less important in the lives of individuals. After all, it defines a smaller number of areas of behavior for individuals.

With the modernization process, science has increasingly explained social and natural phenomena for which religions offered explanations in the past. The Catholic Church, however, until the Second Vatican Council, which took place in 1962, resisted leaving the public debates involving this knowledge. Galileo, for example, was forgiven only in 1992 for having said that the Earth orbits around the Sun. Among the guidelines of the Second Vatican Council was the acceptance of religious freedom and the separation of Church and State.

In the terminology of Casanova (1994), a religious institution can be called a church when it holds the monopoly of faith in a certain territory, which can only be done if it is acting jointly with the State. When there is no separation between State and Church, the moral norms preached by the State religion are valid as laws and what is a sin is also a crime. This represents a double-edged sword for religion. On the one hand, by preventing religious diversity, often forcing the conversion of infidels and condemning heretics to silence, imprisonment, or even death, the church guarantees the stability of its faithful base. On the other hand, when acting together with the State, it can be seen by the people or by intellectuals as part of the organs of oppression and, therefore, for many, adherence to religion is more forced than spontaneous.

Spain would be an example of a society in which State and Church remained united until very recently and, due to its past being associated with an oppressive state, when the State became secular, a large proportion of Spaniards abandoned the church. Today Spain is a country with a high number of people who declare they have no religious affiliation. The opposite situation occurred in Poland, which — invaded by Sweden, divided by Russia, Prussia, and Austria, occupied by Germany and the Soviet Union — had only brief moments of sovereign status. The Church, in this case, did not have a State to which it was bound and always sided with the Polish people oppressed by authorities under foreign control. Perhaps for this reason, the Poles are among those who most declare themselves affiliated with religion in Europe.

For Casanova (1994), the set of mystical beliefs and moral values of the citizens of a nation constitutes a kind of informal civil religion. In the case of the separation of State and Church, the church ceases to be a church and becomes a denomination or a sect. Different religions that share a large number of mystical beliefs and moral values can be considered different denominations of informal civil religion while very different religions would be sects. In the case of the United States, the Catholic religion can be considered a sect until around 1960, when the process of assimilation of Catholic immigrants into North American society advanced to the point that the culture of Catholics became very similar to the culture of Protestants. The election of the Catholic John Kennedy to the presidency of the republic symbolizes the conclusion of the process of evolution of the Catholic Church from sect to denomination.

With the advancement of science, modernization of society, and separation between State and Church, the Church loses ground in public debates and focuses on what remains as a specific task of religious institutions: answering questions about the meaning of life and what is right and wrong and to help individuals to find mystical explanations for their feelings and perceptions. In other words, religion would be limited to matters of private life. For Casanova (1994), however, with the failure of the Enlightenment project to produce a more morally advanced, more harmonious, and happier society, with the abandonment by philosophers of the task of identifying what would be the common good and morally correct behavior, religions have a new opportunity to participate in public debates.

The modernization process implies moving from a situation in which fate dominates most of people's lives to one in which there are many possible choices and, to a large extent, these

choices are religious (Berger, 2014, p. 20).

From the individual point of view, secularization is the process of loss of religiosity and increasing occupation of individuals' cognitive space by knowledge and explanations of the world based on the scientific knowledge to which they have access (Berger, 2014, p. 20).

It is important to distinguish the concepts of plurality and pluralism. Plurality is the existence and coexistence of people with a diversity of religious or secular worldviews, while pluralism is a social context favorable to plurality (Yang, 2014).

Cognitive contamination is a process that occurs whenever people interact amicably. It is the tendency of individuals to assimilate knowledge and values from each other. When people of different religions or with secular worldviews interact amicably, they tend to influence each other. Plurality in an environment of pluralism multiplies the diversity of social contexts that are different from the specific religious norms.

Individuals can adopt a practice of live and let live, avoiding addressing contradictions between worldviews. In this case, there will be a low degree of cognitive contamination and permanence of a deep plurality. If interactions are deeper and individuals discuss their worldviews, a relativization—in which what was taken as true and correct ceases to be—or even relativism, in which uncertainty is celebrated as something good. In this case, by undermining certainties, pluralism initiates a process of deinstitutionalization of religion (Berger, 2014, p. 37).

Berger says that social institutions reflect mental structures. Thus, we can say that the State (confessional or secular), as a macro phenomenon, is the cause and/or consequence of the type of (non)existent pluralism in personal relationships.

As a reaction to this risk of relativization or relativism, some individuals may adopt fundamentalist attitudes, striving to maintain their certainties, and to keep their community living according to these certainties. Fundamentalism is an effort to restore threatened certainties, and can be reactionary (seeking the return of an idyllic time when everyone followed the rules dictated by God) or progressive (based on a doctrine that preaches the change of values, such as Marxism-Leninism). The implementation of a fundamentalist project leads either to a totalitarian state or to a ghetto that tries to avoid cognitive contamination (Berger, 2014). For Berger (2014), both fundamentalism and relativism are dangerous:

> Fundamentalism balkanizes a society, leading either to ongoing conflict or to totalitarian coercion. Relativism undermines the moral consensus without which no society can survive. (Berger, 2014, p. 15)

In recent decades, technological advances with the corresponding increase in productivity, together with the establishment of a social welfare state in some of the countries with the most advanced economies, resulted in an increase in schooling, improvement in health conditions with a strong reduction in rates of infant mortality and a social security system that guarantees that individuals will have access to housing, food, and medical care even in the event of unemployment and during old age. In this new context, various cultural practices and institutions that restricted the freedom of individuals, especially women, seeking to ensure a high birth rate and adherence to the local community or national society, and which were necessary for the survival of society, become unnecessary. In an adaptation to the new context, people start to tolerate behaviors that do not lead to greater fertility, support equality between men and women and freedom of expression, and accept people's autonomy to choose their own destinies. In short, there is an increase in emancipative values (Inglehart, 2021; Inglehart & Welzel, 2005; Minkov et al., 2020; Welzel, 2013).

Religions that defend behaviors and values contrary to human emancipation tend to lose followers in countries with a more developed economy and a better-structured social welfare state. In these countries, people have less reliance on religion to reduce anxiety about the future and pursue happiness (Inglehart, 2021; Minkov et al., 2020; Turner et al., 2018). Efficient

government institutions such as a credible justice system have the potential to reduce the need for spiritual comfort to accept unjust acts and unequal treatment (Norenzayan & Gervais, 2013). However, economic development does not result in greater existential security for the majority of the population of a country if the level of inequality is too high and social security coverage is insufficient, which helps to explain the delay in the USA in reducing religiosity (Inglehart, 2021).

According to Inglehart (2021), religious attitudes mostly change with generational replacement. Moreover, due to people's propensity to seek social acceptance, when the majority of the population is religious, those people who internally question some part of the religious belief system may prefer to avoid confrontation and stay as members of a religious community. This means that there is a tipping point when the number of non-religious people exceeds a certain level (as in Sweden in the 1990s) and, then, the propensity to conformity instead of delaying the decline of religiosity might accelerate it. In addition to a propensity to conformity, individuals tend to adopt the beliefs held by skilled people and supported by "credibility-enhancing displays" (CREDs), i.e., when people make costly sacrifices that demonstrate strong commitment to their beliefs. On the other hand, people are more likely to abandon their faith if they do not witness many CREDs in childhood or when moving to an environment of non-religious people (White et al., 2021). Belief in supernatural beings is more likely to be realized in individuals who witness other people performing costly rituals that demonstrate their faith. These demonstrations of faith are more convincing than speech unaccompanied by concrete actions. In societies where religiosity is high, children grow up seeing adults investing time and material resources in prayers, cults, and other rituals that do not prove that gods and spirits exist but prove that the beliefs are authentic and not forged (Norenzayan & Gervais, 2013).

The process of social conformity is especially strong among people whose personality has strong traces of agreeableness and conscientiousness because these people are more concerned with conflict and ready to sacrifice freedom for harmony (Saroglou, 2010). As evidence that these two processes have explanatory power, Inglehart (2021) noted that the decline of religious beliefs was happening faster than the decline of religious attendance.

The expectation of secularization theorists that the advance of scientific knowledge would promote analytical thinking and undermine religiosity mostly did not happen. Although non-religiousness and atheism are more common among scientists, the belief systems of the general public do not seem to have changed much due to scientific and technological progress. One possible reason for this is that for most people analytical thinking only predominates in their professional activities. What they learn about science in school is not overwhelmingly present in their everyday thoughts.

Inferring that there are invisible intentional agents is in line with people's intuitions. It takes a deliberate effort to think analytically and compare intuitions with empirical evidence to disbelieve one's intuitions. People who engage more in analytical thinking are more critical of their intuitions and less accepting of religious beliefs (Norenzayan & Gervais, 2013; Saroglou, 2010; White et al., 2021). Although analytical thinking can be used to rationalize intuitions, Pennycook et al. (2020) found in their research that people who believe that beliefs should change according to evidence are less religious. Cognitive flexibility has also been identified as a factor that increases the chances of an individual abandoning religion (Zmigrod et al., 2019). That is, in a context of economic modernization and increased social security, people who adapt more quickly to changes in the environment or internal mental states are less likely to remain religious.

So far we have seen explanations of the process of religiosity decline, but what about the future of religion? Inglehart (2021) argues that humans need a belief system, although not necessarily a religious one:

> Religious markets theory, as developed by Stark and Bainbridge, became widely

> influential. According to them, one reason for rejecting secularization was that humans will always need religion. I would agree with this claim if it is broadened to hold that humans will always need a belief system. Humans have evolved with a deep-rooted tendency to seek patterns and explanations for the world around them and a sense of what is right and wrong. This seems to be a permanent part of human nature. But one‘s belief system need not be religious (Inglehart, 2021, p. 54).

Hypotheses

In this paper, I will run some lagged regressions with WVS data aggregated by country and wave to investigate the causal sequence of religiosity decline. It is well established in the literature that economic development improves material security, creating a context favorable to self-expression values (Inglehart & Welzel, 2005) and emancipative values (Welzel, 2013). Hence, the first hypothesis is:

> H_1. Economic development is followed by increasing emancipative values.

Inglehart (2021) has shown that the expansion of individual choice norms causes a decline in religiosity. However, Welzel (2013) demonstrated that the whole *emancipative values index*, which includes a *choice values* component, is a stronger explanation for many other social phenomena than any of its components. And the reason for this strength is that it is a compository index, relying more on theoretical considerations than on statistical correlations in the choice of its indicators. Thus, the second hypothesis is:

> H_2. Both the emancipative values index and its choice components have significant effects on religiosity.

And:

> H_{2a}. The effect of emancipative values index on religiosity is stronger than the effect of its choice component on religiosity.

Inglehart (2021) argues that religious belief is declining more rapidly than religious attendance. Even when no longer believe in religion, some people continue to go to church to keep their social network alive. Closely related to this finding, another hypothesis to be tested in this paper is:

> H_3. Causality tests with lagged regressions will show that changes in religiosity — as measured by the importance that individuals attribute to religion — have precedence over changes in attendance to religious services.

To conclude this investigation on the social dynamics of religiosity decline, I will also run multilevel models with both age and cohort as independent variables. Inglehart (2021) has found that religiosity decline is mostly due to generation replacement. Rather than becoming more religious while aging, the religiosity decline is mostly due to young people abandoning the belief system of their parents. Thus, my last hypothesis is:

> H_4. Cohort has an effect on religiosity stronger than age has.

Data and results

I aggregated data from the World Values Survey trend (1981-2022) cross-national data-set (Haerpfer et al., 2022) by wave and country to create the variables used in this section. The World Values Survey asks respondents to indicate how important religion is in their lives, and I used this variable as numeric (0 for *Not at all important*, $1/3$ for *Not very important*, $2/3$ for *Rather important*, and 1 for *Very important*). Similarly, the question *Apart from weddings and funerals, about how often do you attend religious services these days?* was used as numeric, with 0 for *Never, practically never*, and 1 for *More than once a week*. *Religiosity* was calculated as the average value of *Importance of religion*, *Attendance to religious services*, and whether the respondent considers herself a religious person. For both *Choice values* and *Emancipative values*, I used variables already present in the World Values Survey trend data-set (respectively, Y023 and Y020). Finally, data on Gross National Income Per Capita comes from UNDP (2022). The following abbreviations of variable names will be used in this section:

Abbr.	Full name
rimp	Importance of religion
rsrv	Attendance to religious services
rel	Religiosity
choice	Choice values
ev	Emancipative values
log_gnipc	Logarithm of Gross National Income

In order to run the lagged regressions, I averaged data from the World Values Survey trend data-set by wave and country and, then, rearranged the data to make it suitable for the time series analyses. Tables 2 and 3 illustrate these two steps for a single country and variable.

Table 2: Excerpt from data-set with Religion importance aggregated by WVS wave

Country	Wave	Religion importance
BRA	1981-1984	
BRA	1989-1993	0.790
BRA	1994-1998	0.838
BRA	1999-2004	
BRA	2005-2009	0.802
BRA	2010-2014	0.801
BRA	2017-2022	0.755

Table 3: Excerpt from Dataset for time series analyses

Country	Wave 1	Wave 2	rimp_{t-1}	rimp
BRA	1989-1993	1994-1998	0.790	0.838
BRA	2005-2009	2010-2014	0.802	0.801
BRA	2010-2014	2017-2022	0.801	0.755

As expected, Granger causality test for Log GNIPC and Emancipative values confirms that economic growth precedes the rising in emancipative values (Table 4): when Log GNIPC is the dependent variable (Model 1), emancipative values have no significant effect if controlled by the Log GNIPC as measured at the time of the previous World Values Survey wave ($t-1$)

while Log GNIPC has a positive and significant effect on emancipative values (Model 2), even controlling for the lagged emancipative values.

Table 4: Gross National Income and emancipative values

	Dependent variable:	
	log_gnipc	ev
	(1)	(2)
log_gnipc_{t-1}	0.934^{***}	
	(0.037)	
ev	-0.011	
	(0.027)	
ev_{t-1}		0.940^{***}
		(0.039)
log_gnipc		0.129^{**}
		(0.050)
Constant	0.067^{***}	-0.075^{**}
	(0.024)	(0.035)
Observations	134	142
R^2	0.909	0.897
Adjusted R^2	0.908	0.896
Residual Std. Error	0.022	0.033
F Statistic	657.507^{***}	608.391^{***}
Note:	*p<0.1; **p<0.05; ***p<0.01	

Models 1 and 2 of Table 5 show *Choice values* and *Religiosity* correlated, with *Religiosity* in Model 1 only a bit less significant than *Choice values* in Model 2. That is, the causal direction does not become clear with a time lag of about five years. However, models 3 and 4 show that the effect of *Emancipative values* on *Religiosity* is clearly higher in Model 3 than the reverse effect in Model 4. Even a short five year time span is enough to reveal the negative effect of *Emancipative values* on *Religiosity*.

Table 5: Religiosity, pro-choice values, and emancipative values

	Dependent variable:			
	choice	rel	ev	rel
	(1)	(2)	(3)	(4)
choice_{t-1}	0.974^{***}			
	(0.044)			
ev_{t-1}			0.959^{***}	
			(0.039)	
rel	-0.089^{***}		-0.036^{*}	
	(0.033)		(0.019)	
rel_{t-1}		0.860^{***}		0.850^{***}
		(0.035)		(0.033)
choice		-0.168^{***}		
		(0.041)		
ev				-0.294^{***}
				(0.062)
Constant	0.085^{***}	0.133^{***}	0.050^{*}	0.209^{***}
	(0.031)	(0.032)	(0.025)	(0.042)
Observations	133	137	142	142
R^2	0.881	0.897	0.895	0.900
Adjusted R^2	0.879	0.896	0.894	0.899
Residual Std. Error	0.057	0.062	0.033	0.060
F Statistic	480.225^{***}	584.155^{***}	594.412^{***}	627.697^{***}
Note:				*p<0.1; **p<0.05; ***p<0.01

The four models in Table 6 are similar to the models shown in the previous table, but including Log GNIPC as control. The results of Models 1 and 2 are similar to what we have found in the previous table, but, in Model 3, *Religiosity* is not significant while *Emancipative values* remain significant in Model 4. This means that rising *Emancipative values* have a stronger and faster effect on *Religiosity* than its *Choice* component alone.

Table 6: Religiosity, pro-choice values, and emancipative values (with controls)

	Dependent variable:			
	choice	rel	ev	rel
	(1)	(2)	(3)	(4)
log_gnipc	0.247^{***}	-0.215^{**}	0.114^{**}	-0.169^{*}
	(0.084)	(0.094)	(0.051)	(0.095)
choice_{t-1}	0.921^{***}			
	(0.046)			
ev_{t-1}			0.912^{***}	
			(0.043)	
rel	-0.063^{*}		-0.027	
	(0.033)		(0.019)	
rel_{t-1}		0.848^{***}		0.842^{***}
		(0.035)		(0.033)
choice		-0.113^{**}		
		(0.047)		
ev				-0.220^{***}
				(0.074)
Constant	-0.126	0.305^{***}	-0.034	0.327^{***}
	(0.078)	(0.081)	(0.045)	(0.078)
Observations	133	137	142	142
R^2	0.888	0.901	0.899	0.903
Adjusted R^2	0.886	0.899	0.897	0.900
Residual Std. Error	0.055	0.061	0.033	0.060
F Statistic	341.658^{***}	403.503^{***}	409.128^{***}	425.987^{***}
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7 shows the most extreme cases of religiosity change caught by the WVS in its last six waves. As shown by Inglehart (2021), religiosity declined the most in advanced Western countries, and had the biggest increase in countries that were under Soviet Union influence.

Table 7: Countries with the largest increase and the largest decline in religiosity between the last available survey and the first one

	Religiosity						
Country	89-93	94-98	99-04	05-09	10-14	17-22	Change
South Korea	0.584	0.429	0.431	0.438	0.452	0.289	-0.295
Canada			0.610	0.569		0.316	-0.294
USA		0.723	0.739	0.643	0.600	0.505	-0.218
Spain	0.537	0.553	0.519	0.383	0.338		-0.200
Chile	0.660	0.637	0.639	0.568	0.494	0.463	-0.198
Cyprus				0.590	0.620	0.663	0.073
Ukraine		0.487		0.572	0.583	0.569	0.081
Armenia		0.582			0.721	0.682	0.099
China	0.053		0.152	0.246	0.131	0.161	0.108
Georgia		0.694		0.793	0.806		0.112
Russia	0.352	0.417		0.482	0.443	0.553	0.201

A simple test does not allow to see any clear causality direction. On Table 8, *Attendance to religious services* explains *Religion importance* about as much as the reverse when controlled by the lagged dependent variable.

Table 8: Importance of religion and attendance to religious services

	Dependent variable:	
	rimp	rsrv
	(1)	(2)
rimp_{t-1}	0.899^{***}	
	(0.032)	
rsrv	0.136^{***}	
	(0.041)	
rsrv_{t-1}		0.601^{***}
		(0.052)
rimp		0.276^{***}
		(0.041)
Constant	-0.001	0.002
	(0.014)	(0.020)
Observations	135	136
R^2	0.953	0.828
Adjusted R^2	0.952	0.826
Residual Std. Error	0.048	0.071
F Statistic	$1{,}328.734^{***}$	320.586^{***}
Note:	*p<0.1; **p<0.05; ***p<0.01	

However, for reasons that I still have to investigate, if we split the data-set in two, and run separate test for countries with rising religiosity and for countries with declining religiosity, as in

Table 9, then *Religion importance* remains significant to explain *Attendance to religious services* in both countries with rising religiosity (models 1 and 2) and countries with declining religiosity (models 3 and 4).

Table 9: Importance of religion and attendance to religious services (distinguishing countries with rising and declining religiosity)

	Dependent variable:			
	rimp	rsrv	rimp	rsrv
	(1)	(2)	(3)	(4)
$rimp_{t-1}$	0.857^{***}		1.041^{***}	
	(0.045)		(0.035)	
rsrv	0.091		0.025	
	(0.057)		(0.045)	
$rsrv_{t-1}$		0.647^{***}		0.699^{***}
		(0.079)		(0.055)
rimp		0.294^{***}		0.181^{***}
		(0.064)		(0.043)
Constant	0.077^{***}	0.010	-0.067^{***}	-0.015
	(0.018)	(0.030)	(0.015)	(0.021)
Observations	53	55	82	81
R^2	0.963	0.864	0.972	0.882
Adjusted R^2	0.962	0.858	0.972	0.879
Residual Std. Error	0.041	0.066	0.038	0.057
F Statistic	658.321^{***}	164.775^{***}	$1{,}395.624^{***}$	292.059^{***}
Note:				*p<0.1; **p<0.05; ***p<0.01

The results remain the same even with the addition of *Emancipative values* and *Log GNIPC* as controls (Table 10). Indeed, Log GNIPC is not significant when controlled by *Emancipative values*, and *Emancipative values* is significant only to explain *Religion importance*, which corroborates the causal sequence:

Economic development → Emancipative values →
Declining importance of religion → No attendance to religious services

Table 10: Importance of religion and attendance to religious services (distinguishing countries with rising and declining religiosity, with controls)

	Dependent variable:			
	rimp	rsrv	rimp	rsrv
	(1)	(2)	(3)	(4)
$rimp_{t-1}$	0.838^{***}		0.970^{***}	
	(0.048)		(0.042)	
rsrv	0.081		0.019	
	(0.059)		(0.044)	
$rsrv_{t-1}$		0.639^{***}		0.712^{***}
		(0.084)		(0.057)
rimp		0.285^{***}		0.257^{***}
		(0.074)		(0.055)
ev	-0.101	-0.003	-0.139^{**}	0.189^{*}
	(0.105)	(0.175)	(0.066)	(0.106)
log_gnipc	-0.055	-0.099	-0.100	0.058
	(0.116)	(0.186)	(0.075)	(0.118)
Constant	0.180^{**}	0.104	0.133^{*}	-0.205^{*}
	(0.084)	(0.138)	(0.067)	(0.111)
Observations	53	55	82	81
R^2	0.966	0.865	0.976	0.890
Adjusted R^2	0.963	0.854	0.975	0.884
Residual Std. Error	0.041	0.067	0.036	0.056
F Statistic	336.168^{***}	80.121^{***}	787.116^{***}	153.298^{***}
Note:				*p<0.1; **p<0.05; ***p<0.01

The results corroborate the hypotheses: economic development creates a social context of security favorable to the rise of emancipative values, which clash with values defended by the most successful religions of the last centuries. This leads to a decline in religiosity but individuals need time to replace old relationships and build new ones with fellow non-religious people.

Finally, multilevel regressions on Table 11 confirm that cohort effect on religiosity is stronger than the effect of age. Model 1 has country/wave as the second level, and Model 2 has both region of world and country/wave as higher levels. The stronger cohort effect remains even in Model 2, which controls for Log GNIPC. That is, in countries where religiosity is declining, younger people are less religious and it is not expected that they will become much more religious later in life unless deep and lengthy economic crises undermine their well-being.

Table 11: Multilevel regressions with Religiosity index as dependent variable

	Dependent variable:	
	ridx	
	(1)	(2)
age330-49	0.006	0.009
	(4.271***)	(4.252***)
age350 and more	0.013	0.015
	(5.231***)	(4.067***)
cohort1921-1940	−0.040	−0.037
	(−7.698***)	(−4.880***)
cohort1941-1950	−0.066	−0.061
	(−12.670***)	(−7.979***)
cohort1951-1960	−0.087	−0.082
	(−16.397***)	(−10.517***)
cohort1961-1970	−0.096	−0.090
	(−17.435***)	(−11.213***)
cohort1971-1980	−0.110	−0.102
	(−19.047***)	(−12.195***)
cohort1981-1990	−0.129	−0.123
	(−21.277***)	(−13.994***)
cohort1991-2004	−0.142	−0.139
	(−21.715***)	(−14.668***)
sexFemale	0.057	0.064
	(70.544***)	(54.211***)
educMiddle	−0.002	−0.005
	(−1.642)	(−2.965***)
educUpper	0.005	0.001
	(3.774***)	(0.392)
income	0.004	0.018
	(2.246**)	(6.992***)
log_gnipc		−0.175
		(−1.019)
wiid_gini		0.472
		(3.358***)
ev	−0.333	−0.351
	(−113.482***)	(−83.343***)
Constant	0.809	0.677
	(64.739***)	(3.762***)
Observations	387,945	192,565
Log Likelihood	−11,601.670	−10,711.500
Akaike Inf. Crit.	23,237.330	21,463.010
Bayesian Inf. Crit.	23,422.100	21,666.370
Note:	*p<0.1; **p<0.05; ***p<0.01	
	T-statistics between parentheses.	

Conclusion

Empirical evidence from neurosciences and from psychology indicate that religion cannot be seen as a natural human feature. The brain regions activated during spiritual thoughts are the same that are activated during other activities, such as when a person is thinking about what other persons think or feel. Moreover, some personality traits are more strongly correlated with religiosity, but there is no personality trait that seems to be exclusively correlated with religious attitudes and behaviors.

Research on primatology and models of human evolution shows evidence that religiosity and religion evolved as a byproduct of the evolution of the ability to empathy that allows individuals to imagine and calculate what others are feeling and thinking and the increasing need of cooperation required for survival in a savanna. Although not strictly a part of human nature, the belief in supernatural forces and beings is felt as convincingly real by humans. Thus, religiosity is easily learned and does not disappear easily. Adults that have grown in a religious environment and that turned into religious persons most probably will stay religious for their entire life. But young people who live in an environment that is compatible with a level of freedom forbidden by their parents' religion, might conclude that the religion is not the true source of right norms and that guidance for how to behave might be found elsewhere.

In this paper, I have found evidence in favor of existing theories that explain religiosity declining. The increasing existential security provided by modernization and democratization of societies makes people feel and think that they can behave more freely than allowed by mainstream religions. Religion becomes less important for those people. They may still go to church to enjoy the company of family and friends but, eventually may find new friends and leave the religion.

References

Aquino, J. A. de. (2011). Cooperation among virtual anthropoids in a complex environment. *Interdisciplinary Description of Complex Systems*, *9*(1), 56–80. http://indecs.eu/2011/indecs2011-pp56-80.pdf

Barkow, J. H., Cosmides, L., & Tooby, J. (Eds.). (1992). *The adapted mind: evolutionary psychology and the generation of culture*. Oxford University Press.

Berger, P. L. (2014). *The many altars of modernity: toward a paradigm for religion in a pluralist age*. De Gruyter.

Botero, C. A., Gardner, B., Kirby, K. R., Bulbulia, J., Gavin, M. C., & Gray, R. D. (2014). The ecology of religious beliefs. *Proceedings of the National Academy of Sciences*, *111*(47), 16784–16789. https://doi.org/10.1073/pnas.1408701111

Casanova, J. (1994). *Public religions in the modern world*. University of Chicago Press.

Grafman, J., Cristofori, I., Zhong, W., & Bulbulia, J. (2020). The neural basis of religious cognition. *Current Directions in Psychological Science*, *29*(2), 126–133. https://doi.org/10.1177/0963721419898183

Haerpfer, C., Inglehart, R., Moreno, A., Welzel, C., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin, E., & Puranen, B. (Eds.). (2022). *World Values Survey trend file (1981-2022) cross-national data-set*. JD Systems Institute & WVSA Secretariat.

Inglehart, R. (2021). *Religion's sudden decline: what's causing it, and what comes next?* Oxford University Press. https://academic.oup.com/book/33489

Inglehart, R., & Welzel, C. (2005). *Modernization, cultural change, and democracy: the human development sequence*. Cambridge University Press.

Jackson, J. C., Caluori, N., Gray, K., & Gelfand, M. (2021). The new science of religious change. *American Psychologist*, *76*(6), 838–850. https://doi.org/10.1037/amp0000818

Kapogiannis, D., Barbey, A. K., Su, M., Zamboni, G., Krueger, F., & Grafman, J. (2009). Cognitive and neural foundations of religious belief. *Proceedings of the National Academy of Sciences*, *106*(12), 4876–4881. https://doi.org/10.1073/pnas.0811717106

Minkov, M., Welzel, C., & Schachner, M. (2020). Cultural evolution shifts the source of happiness from religion to subjective freedom. *Journal of Happiness Studies*, *21*(8), 2873–2888. https://doi.org/10.1007/s10902-019-00203-w

Norenzayan, A., & Gervais, W. M. (2013). The origins of religious disbelief. *Trends in Cognitive Sciences*, *17*(1), 20–25. https://doi.org/10.1016/j.tics.2012.11.006

Pennycook, G., Cheyne, J. A., Koehler, D. J., & Fugelsang, J. A. (2020). On the belief that beliefs should change according to evidence: Implications for conspiratorial, moral, paranormal, political, religious, and science beliefs. *Judgment and Decision Making*, *15*(4), 476–498. https://doi.org/10.1017/S1930297500007439

Saroglou, V. (2010). Religiousness as a cultural adaptation of basic traits: a five-factor model perspective. *Personality and Social Psychology Review*, *14*(1), 108–125. https://doi.org/10.1177/1088868309352322

Turner, J. H., Maryanski, A., Petersen, A. K., & Geertz, A. W. (2018). *The emergence and evolution of religion by means of natural selection*. Routledge,Taylor & Francis Group.

UNDP. (2022). *Human Development Index: All composite indices and components time series (1990-2021)* (Human Development Reports). United Nations Development Programme. https://hdr.undp.org/data-center/documentation-and-downloads

Urgesi, C., Aglioti, S. M., Skrap, M., & Fabbro, F. (2010). The spiritual brain: selective cortical lesions modulate human self-transcendence. *Neuron*, *65*(3), 309–319. https://doi.org/10.1016/j.neuron.2010.01.026

van Elk, M., & Aleman, A. (2017). Brain mechanisms in religion and spirituality: An integrative predictive processing framework. *Neuroscience & Biobehavioral Reviews*, *73*, 359–378.

https://doi.org/10.1016/j.neubiorev.2016.12.031

Welzel, C. (2013). *Freedom rising: human empowerment and the quest for emancipation*. Cambridge University Press.

White, C. J., Baimel, A., & Norenzayan, A. (2021). How cultural learning and cognitive biases shape religious beliefs. *Current Opinion in Psychology*, *40*, 34–39. https://doi.org/10.1016/j.copsyc.2020.07.033

Yang, F. (2014). Agency-driven secularization and Chinese experiments in multiple modernities. In P. L. Berger (Ed.), *The many altars of modernity: toward a paradigm for religion in a pluralist age* (pp. 123–140). De Gruyter.

Zmigrod, L., Rentfrow, P. J., Zmigrod, S., & Robbins, T. W. (2019). Cognitive flexibility and religious disbelief. *Psychological Research*, *83*(8), 1749–1759. https://doi.org/10.1007/s00426-018-1034-3