Is France exceptionally irreligious? A comparative test of the cohort replacement theory

Jörg Stolz, Ferruccio Biolcati, Francesco Molteni[i]

Abstract
While scholars have often pointed to the fact that France might be an exceptionally irreligious country, this hypothesis has not yet been tested with longitudinal data; and nor have researchers tried to account for this alleged irreligiosity. The present article tries to fill this gap in the literature by comparing France to other Catholic countries in Western Europe. To do so, we use the Church Attendance and Religious change Pooled European (CARPE) dataset, which to date is the most extensive dataset of church affiliation and church attendance in European countries, as well as International Social Survey Programme (ISSP) data that allow us to measure religious beliefs and make retrospective estimations as far back as the 1910s. We find that (1) France shows significantly lower aggregate religiosity than other Catholic countries in Western Europe, although this difference has diminished in the last few decades; and (2) this low level of religiosity cannot be explained by France-specific period effects operating in the last 40 years. Rather, secularization in France takes the form of cohort replacement, which has led to differences in religiosity between the countries being reproduced from one generation to the other. In other words, France is so irreligious because it began on the path of secular transition earlier or from a lower level than comparable countries.

1. Introduction

For many observers, France, with its "laïcité à la française", is a unique and special case of how a country may regulate religion and religious diversity institutionally (Baubérot, 2004b, Baubérot, 2014, Baubérot, 2017, Beckford, 2004, Portier, 2016, Willaime, 2009, Zuber, 2017). What is less widely known – although specialists have remarked on it several times –is that France is also a particularly irreligious country (Bréchon, 2000, Dargent, 2010, Stoetzel, 1983).[ii] This is the case even though France is traditionally Catholic, with only small Protestant minorities (Fath, 2005, Fath and Willaime, 2011). The hypothesis that France might be an especially irreligious country has not yet been tested systematically with longitudinal data, and this is precisely what we intend to do in our article.

Recent research has shown that secularization – understood as a decline in religiosity – takes the form of cohort replacement in many Western countries (Crockett and Voas, 2006, Voas and Chaves, 2016).[iii] This means that it is not the case that individuals change their religiosity during their journey through life, either because of lifecycle or period effects; rather, what happens is that more religious cohorts are replaced by less religious cohorts.[iv] While cohort replacement seems to be the major factor in most Western countries, we also find deviating cases, where period effects clearly play a role and individuals become more secular over time (e.g. New Zealand) (Voas and Chaves, 2016), or where countries succeed in either accelerating or decelerating the secularization process (Stolz *et al.*, 2020).

The goal of this article is to see whether France is indeed more irreligious than comparable countries, and whether a possibly "exceptional" French irreligiosity also has "exceptional"

causes that deviate from the more normal mechanism of cohort replacement. What might such an exceptional cause be? It has been suggested that, in the wake of new religious movements and the arrival of Muslims in France since the 1960s, both the French government and actors in civil society have reinterpreted “laïcité” in a particularly anti-religious way (Baubérot, 2004b: 262f., Baubérot, 2014). This in turn could have had specific effects on the general religiosity of individuals that differ from the situation in other European countries. If, however, France’s secularization relies, as in other countries, on cohort replacement, this would mean that French irreligiosity has to be explained by the fact that France began on its secularization path earlier or from a lower level than other countries.

Building on and extending research especially by Bréchon (2000, 2014, 2018, 2019), Lambert (1994, 1995), Willaime (1998), and Dargent (2010), this article therefore addresses two interrelated questions:

(1) Is France really significantly less religious (measured in terms of church attendance, belief in God, and religious affiliation) than traditionally Catholic countries in the West and its neighbouring countries?
(2) Are the mechanisms of secularization (namely, cohort replacement) the same in France as in comparable Western countries, or are there period or lifecycle effects specific to France?

Studying a seemingly "exceptional case" (Ermakoff, 2014), our paper is a contribution both to the sociological literature on the religiosity in France and to the theory of the secular transition and the cohort replacement mechanism in general. Since France is often seen as religiously "exceptional", the fact that its religious evolution is – as we show – perfectly compatible with the framework of the secular transition considerably strengthens this theory.

To answer our questions, we draw on two datasets. First, the Church Attendance and Religious change Pooled European (CARPE) dataset (Biolcati *et al.*, 2020), which to date is the most extensive harmonized dataset of church attendance in European countries, spanning observations from 1973 to 2016. We will use the CARPE dataset to analyse trends in church affiliation as well. The complete dataset is based on five survey programmes (Eurobarometer, European Social Survey (ESS), European Value Survey (EVS), International Social Survey Programme (ISSP), World Value Survey (WVS)), and combines 1665 surveys with information on 1,784,825 individuals. It ranges from 1973 to 2016. Second, we also use a harmonized ISSP dataset (with rounds from 1991, 1998, 2008, and 2018) that permits us to analyze religious belief as well as the retrospective church attendance of mothers, fathers, and respondents (when the latter were children), thus allowing us to observe aggregate church attendance as far back as the 1910s.[v]

2. Theory: France, secularization, and cohort replacement

2.1 The (ir)religiosity of France

That there might be a “French religious exceptionalism” in the way that the French state regulates and perceives religion has often been noted both by French and non-French scholars, and can be summed up in the formula “laïcité à la française” (Amir-Moazami, 2007, Baubérot, 2017, Baudouin and Portier, 2001, Beckford, 2004, Bobineau, 2012, Hunter-Henin, 2012, Michel, 2010, Portier, 2016, Willaime, 2009). Very much open to debate, however, is the extent to which French laïcité is really exceptional. A closer look at the history of church-state

developments in France and comparable countries also shows a surprising number of similarities (Baubérot, 2013, Zuber, 2017).

A less well-known proposition is that France might also be an exceptionally irreligious country. When looking at survey data, several sociological observers have pointed to the relatively low level of French religiosity (Bréchon, 2018, Norris and Inglehart, 2012 (2004), Pollack and Rosta, 2017, Stoetzel, 1983).[vi] Thus, Stoetzel (1983: 265), using EVS data, comments on the fact that France is a country "peu religieux", while Willaime (1998: 158), drawing on EVS data from 1990, claims that "France belongs to the group of countries with the highest percentages of 'non-religious' people". The most explicit recent argument for a "French religious exceptionalism" regarding aggregate religiosity has been made by Claude Dargent (2010), who demonstrates with ESS data that France has an exceptionally low level of religiosity compared to other European countries, and that the correlation between the left-right variable and religiosity is especially high in France (together with Spain).

Obviously, if we want to show a French specificity, then we have to decide which other countries we wish to compare France with. As is well known, comparative analysis is useful when comparing units that are as similar as possible regarding possible confounding variables. The most important dimension for our purposes is the confessional tradition of the country. As we know, countries with a traditional Catholic majority seem to follow different secularization trajectories than confessionally mixed or Protestant countries (Martin, 1978). While Protestant state churches in majoritarian Protestant countries enter into a close union with the state (e.g. Sweden), and while traditionally biconfessional countries tend towards pillarization (e.g. Switzerland, the Netherlands), majoritarian Catholic countries are often characterized by conflictual relationships between the state and the Catholic church (Lipset and Rokkan, 1967, Martin, 1978, Martin, 1991). Since France is clearly a country with a majoritarian Catholic tradition, we have to compare it to other countries in this group: Belgium, Portugal, Spain, Italy, Luxembourg, Austria, and Ireland. Note that we also limit ourselves here to Catholic countries in Western Europe.

While there have been a number of reports of specific French irreligiosity, there has so far been no comprehensive test using longitudinal data, which means that we do not know either when France began showing less aggregate religiosity or whether differences between France and comparable countries have varied over time. This leads us to our first hypothesis:

Hypothesis 1: *France has shown in the last few decades significantly less aggregate religiosity than other Western and traditionally Catholic countries*

2.2 Mechanisms of secularization

Research on secularization in Western countries has made much progress in the last two decades (for overviews see De Graaf 2013, Stolz, 2020a). One of the central insights is that there are a number of factors that seem to secularize society (such as increased education, pluralism, secular competition, or welfare options), but that all of these seem to work almost exclusively by hindering religious transmission from one generation to the next.
(for overviews see De Graaf 2013, Molteni, 2021, Stolz, 2020a)). This can be seen in the fact that secularization in Western countries mainly takes the form of cohort replacement (Crockett and Voas, 2006, Voas and Chaves, 2016, Voas and Crockett, 2005, Wolf, 2008). *On aggregate*, cohorts remain quite stable in most Western countries regarding their religious beliefs and practices. The shift towards secularization that we can see in such countries is, then, mainly

due not to the fact that individuals have lost their faith, but rather to the fact that every new generation is a little less religious than the previous, and that older generations are replaced by younger.[vii]

Demonstrating cohort effects is a more difficult enterprise than one might expect. To make this point clear, we have to make a short note on the famous lifecycle - cohort - period problem (Ryder, 1965). Individual lifecycle effects occur when individuals change their religiosity during their life course, for example by becoming more religious when they grow older or have children, or when they lose their faith as a result of an incurable illness. Cohort effects occur when changes in a given society mean that specific cohorts are affected in specific ways, with these cohorts then taking their changed attributes with them through time. For example, a specific cohort of draft-age men may be affected due to the experience of war. We speak of birth-cohort effects, when cohorts differ in how they have been socialized. Finally, period effects occur when all individuals in a society are affected in a similar way at a given period of time (regardless of age). Thus, a general lockdown due to a virus is a period effect since it may restrict the mobility of everybody in society. It is important for the argument that we will make below to understand that both period and lifecycle effects assume that individual religiosity changes during a person's life course, while cohort effects stress that religiosity is mainly a matter of socialization and therefore does not change during the individual's life. Lifecycle (or age), birth-year cohort, and period effects are logically connected in that birthyear + age = period. This means that we cannot estimate the effects independently of one another (Bell and Jones, 2014, Glenn, 1976). While these effects (lifecycle, cohort, period) can never by separated from one another completely, researchers may still gain a good sense of what is probably going on in their data by using subject-specific theory and common sense.[viii]

Our investigation into the causes of France's secularization now takes the form of a decision between two mutually exclusive hypotheses. On the one hand, it may be that secularization in France is similar to that in comparable countries in that it is a matter of constant cohort replacement. If this is indeed the case, factors like pluralism, education, secular alternatives etc. are hindering religious transmission in France just as in other western countries. The amount of religiosity found in France at a given point t in time would then principally depend on the amount of religiosity found in t-1. This leads to hypothesis 2(a):

Hypothesis 2(a) *France's secularization mainly takes the form of cohort replacement. France shows less aggregate religiosity because it began from a lower level in the early 20th century and has maintained its lead in the secular transition through cohort replacement*

On the other hand, France might be an "exception" regarding not just its level of (ir)religiosity, but also the mechanism of secularization. In other words, it may be that we find period effects in the last 40 years or so that are *specific to France* and that cannot be observed in comparable countries. An obvious candidate for a possible cause of such a period effect can be found the re-actualization of laïcité from the 1980s onward. While the relationship between the Catholic church and the French state became less problematic between the 1950s and 70s, the arrival of new religious movements and religious pluralization in the 1980s and 1990s, and then the political resurgence of Islam that became especially visible in the "affaire du foulard", have led to a re-actualization and hardening of the ideology of laïcité in France (Baubérot, 2017, Beckford, 2004, Portier, 2016, Zaretsky, 2016). Thus, Beckford (2004: 28) argues that, in recent decades "(...) the State's reluctance to regard religious movements outside the mainstream as acceptable, or even permissible, is hardening." Portier and Willaime (2021: 230)

note that the paradigm of laïcité has changed: "In the 1970s, it was thought that social harmony could emerge from the free play of singularities; it is now asserted that the unity of a people presupposes regulation from above." (Translation ours). And Zaretsky (2016) goes so far as to write: "For nearly a century, laïcité worked well enough. It ensured public space for both those who believed — not just Catholics and Protestants, but Jews as well — and those who did not. But with the 1980s and 1990s came a growing number of immigrants, most of whom were Muslim, from North Africa. And so a different kind of conflict between the French state and established religion began to take shape." This, according to him, led to an "aggressive, fundamentalist version of laïcité" among many French intellectuals and politicians. Hence our hypothesis 2(b):

Hypothesis 2(b) France's secularization has the form of France-specific period effects (the "reactualization of laïcité"). These effects explain France's especially low aggregate religiosity

3. Method

3.1 Using the CARPE dataset to measure church attendance

The Church Attendance and Religious change Pooled European (CARPE) dataset is to date the most extensive harmonized dataset of religious affiliation and church attendance in European countries, spanning observations from 1973 to 2016. The complete dataset consists of a harmonization of five survey programmes (Eurobarometer, ESS, EVS, ISSP, WVS), and combines 1665 surveys with information on 1,784,825 individuals. It ranges from 1973 to 2016.[ix] The CARPE harmonization project does not include weights (Biolcati, Molteni, Quandt and Vezzoni, 2020).

Using the CARPE dataset instead of only one of the different surveys that are part of CARPE (e.g. EVS or ISSP) has a crucial advantage: by increasing the number of observations, we can greatly increase the reliability of the estimates, especially when trying to measure change over a large number of cohorts and years. This comes at a price, however. The CARPE dataset only has church attendance and religious affiliation as its dependent variables, and only includes a limited number of independent and control variables. When analyzing religious belief and retrospective church attendance on the part of respondents and their parents, we therefore supplement our analysis with ISSP data. We chose ISSP, a high-quality, multi-round survey, for our complementary analysis, because it allows analysis not just of current, but also of retrospective, religiosity.[x]

We select in the CARPE dataset only the Catholic countries in Western Europe: France, Austria, Belgium, Ireland, Italy, Luxembourg, Portugal, and Spain. We exclude individuals with a non-Christian religion, since the items that we use are not adapted to non-Christians. We select individuals in the age range of 20 to 90. This leaves us with a subset of 287 harmonized surveys and 452,760 individuals (see Table A1, Appendix).

Our first dependent variable is *religious affiliation (yes/no*), and our second is *implied probability of church attendance*. The latter is calculated as the ratio of the number of weeks that a person goes to a religious service per year, divided by the number of weeks in a year. Thus, a person who claims to go to church on a monthly basis receives a score of 12/52 = 0.23, while a person who claims to go two to three times a year receives a score of 2.5/52 = 0.05.[xi] Implied probability of church attendance is an excellent way to harmonize measures of church

attendance across surveys (Table A1, Appendix) (Biolcati, Molteni, Quandt and Vezzoni, 2020, Hout and Greeley, 1998).

Our first independent variable is *survey year*. The range of survey years differs for different Catholic countries, and ranges from a minimum of 27 years (Portugal) to 43 years (Belgium, Spain). For France, the range is 42 years. Our second independent variable is *birthyear* cohort. We distinguish nine different birthyear cohorts, the first consisting of individuals born up to, and including, 1920. Each following cohort spans 10 years, thus giving us a cohort born in 1921-1930, a cohort born in 1931-1940, and up until a cohort born in 1991-2000. Our third independent variable is *country*.

The descriptive information in Table A1 (Appendix) shows the mean church attendance of the different countries, with France at the low end (0.154), and Ireland at the high end (0.586) of the spectrum.[xii] The CARPE data show an overall mean age of 47.1 and an overall percentage of women of 54.2%.

In the extremely rare cases where data are missing in the CARPE dataset, we use listwise deletion. We control for the effect of the different studies (ESS, ISSP, etc.).[xiii]

3.2 Using a harmonized ISSP dataset to measure church attendance and belief

We use a cumulated ISSP dataset harmonizing the rounds from 1991, 1998, 2008, and 2018.[xiv] While the ISSP dataset has fewer observations than the CARPE dataset, it has two advantages. First, we can investigate religious beliefs (such as belief in God). Second, it has retrospective questions about church attendance of respondents and their parents when the former were children, which allows us to estimate rates of church attendance as far back as the 1910s.

We select the Catholic countries in Western Europe that are available in this dataset: namely, France, Austria, Ireland, Italy, Portugal, and Spain (Belgium and Luxembourg did not participate). As in the CARPE dataset, we exclude individuals with a non-Christian religion. We select individuals in the age range of 20 to 90. The dataset thus includes 19 surveys and 23,071 individuals (Table A2, Appendix). We use weighted data.

The dependent variable in our ISSP analysis is *belief in God*. The response categories were 1 = "I don't believe in God"; 2 = "Don't know whether there is a God, don't believe there is a way to find out"; 3 = "Don't believe in a personal God, but I do believe in a Higher Power"; 4 = "I find myself believing in God some of the time, but not at others"; 5 = "While I have doubts, I feel that I do believe in God"; 6 = "I know God really exists and have no doubts about it".[xv] Our other dependent variable is *implied probability of church attendance of mother, father, and respondent* when the latter was a child. The values of this variable range from 0 to 1. The wording of the question is: "When you were a child, how often did your mother attend religious services?" We again transformed the nine response categories that ranged from 1 = "Never" to 9 = "Several times a week" into implied probabilities as explained above.

As our main independent variable, we here use *survey years*. For Austria, Ireland, and Italy, we have data for all four time points (1991, 1998, 2008, 2018); for France, Portugal, and Spain, we only have data for 1998, 2008, and 2018. The second independent variable is *birthyear cohort*. As with the CARPE dataset, we use birthyear cohorts with a ten-year span. The oldest cohort comprises people born before, and including, 1920, while the youngest cohort comprises

those born from 1981 to 1990. Our third independent variable is *country*. We used weighted data and imputed missing values.[xvi]

We also used the ISSP dataset for robustness analyses, replicating the results for affiliation/attendance and cohort while controlling for other variables

In the Appendix, we give some descriptive information on the different variables used in our two datasets.

In a first step, we will present our results in the form of graphs with the help of LOESS-smoothing (LOcally Estimated Scatterplot Smoothing), a method close, but not similar to, moving averages.[xvii] The method uses locally weighted regression (Cleveland, 1979, Fox and Weisberg, 2018). The basic idea of loess-smoothing is to create an estimate for every value of the dependent variable with a regression that uses only a local subset of the y-values and gives closer neighbours a higher weight than more distant neighbours. Changing the span of the local neighbourhood that is considered will change the nature of the smoothing: larger spans create smoother curves.[xviii] The advantage of using a smoother in contrast to a parametric function (i.e. a linear or quadratic function) is that we do not have to specify a function in advance. We are thus open to possible unexpected variability, such as created by country-specific shocks. The advantage of LOESS compared to a simple moving average is that it assigns more weight to closer neighbours than more distant neighbours in the window of observation; moving averages, however, assign an equal weight to all observations in the window of observation.[xix] The higher flexibility of LOESS comes with a price: it does not produce a regression function that is easily represented by a mathematical formula and there are no "coefficients" to report. We use LOESS here simply for descriptive purposes.

It is useful to show the importance of cohort replacement by means of graphs, but they should be complemented with statistical models estimating the size of the effects. There is an important discussion on how this should best be done. We use a method proposed by Firebaugh (1989) that Voas/Chaves (2016) applied to the same problem.

Some authors have suggested using cross-classified models to solve the problem of the logical interconnectedness of age effects, period effects, and cohort effects (Yang and Land, 2013), but the results of these methods have been strongly criticized (Bell and Jones, 2014, Pelzer *et al.*, 2015). We therefore adhere to the conventional method of linear decomposition only of age and cohort proposed by Firebaugh (1989: 253) and used recently by Voas and Chaves (2016). The method uses a simple OLS regression:

$$y = b_0 + b_1 \text{ survey year} + b_2 \text{ cohort} + e$$

The goal is to partition the overall change in y into a part that is caused by the passage of time and a part that is caused by birthyear cohort. In our formula, the coefficient b1 shows the average change of y with every additional year over time (that can be attribute to either a lifecycle or a period effect), controlling for cohort. The b2 coefficient, on the other hand, shows the effect of an additional birthyear (a birthyear cohort effect), controlling for the survey year in which the individual was interviewed. b0 is the intercept and e is noise. The degree of change due to the two mechanisms can then be calculated as

Intracohort change = $b_1 (t_T - t_1)$
Cohort replacement = $b_2 (C_T - C_1)$

Where $t_T - t_1$ equals the range of survey years covered and C_T denotes mean birth year at time T, C_1 denotes mean birth year at time 1.

The models were calculated with R, version 3.6.3. The syntax files that permit the replication of all results can be obtained from the authors.

4. Results

4.1 Is France exceptionally irreligious?

Turning to our first question, we find that, when compared to other Catholic countries in Western Europe, France has indeed shown very low aggregate religiosity in recent times.

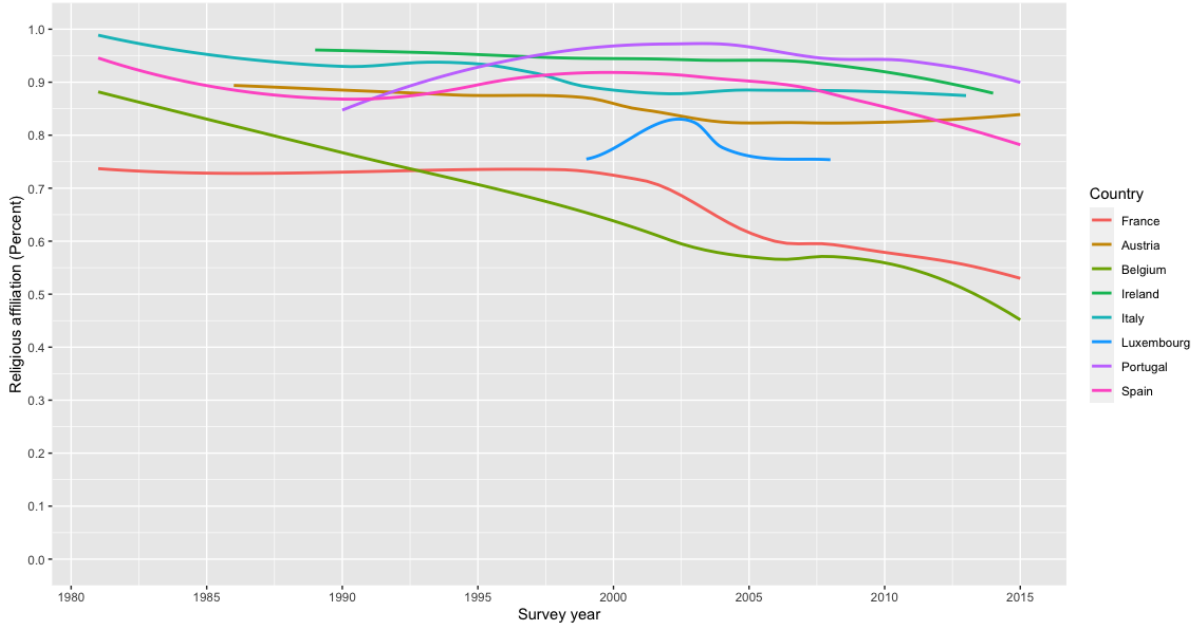
We can see in Figure 1 that France's aggregate percentage of affiliation to a religion is significantly lower than it is in all other Catholic countries except Belgium. Belgium shows an even lower percentage of affiliation, but the differences between France and Belgium are slight and not significant. The percentage of religious affiliation diminishes over time in all these countries, but at very different levels. While the affiliation rate in all other Catholic countries except Belgium hovers above 80% and sometimes even reaches 90%, in France it fell from around 70% in 1997 to around 50% in 2015.

Figure 2 shows that France has had significantly lower aggregate church attendance than all other Catholic countries in Western Europe (including Belgium) since the early 1970s. As a matter of fact, the difference was greater then than now, and seems to have diminished somewhat. Thus, aggregate church attendance in France may have reached the lowest level possible, with other Catholic countries in Western Europe "catching up" with this level. France thus indeed has an "exceptionally" low aggregate level of church attendance compared to other Catholic countries. Note that Ireland is another "exception", in that it began from a very high level with regard to the implied probability of church attendance, and has witnessed in the last few decades a very strong drop; it nonetheless still has today the highest aggregate level of church attendance of all Catholic countries in Western Europe.

Unfortunately, the CARPE data permit us to observe aggregate church attendance back only to the 1970s. To look further back, we can use retrospective data created with ISSP data. In the ISSP religion module, respondents are asked how often their mother, father, and they themselves attended religious service "when they were a child". Since respondents are from different birth cohorts, their childhood took place in different decades, permitting us to estimate the aggregate attendance of mothers, fathers, and children in different decades as far back as the 1930s. To be able to do this, we attribute the levels of church attendance of the mother, the father, and the respondent as a child to the year when the respondent was 10.[xx] In Figure 3, we use this methodological tool to show that church attendance on the part of the mother, the father, and the respondent herself when she was a child has been significantly lower in France than in comparable Catholic countries in Western Europe since at least the 1910s. It also shows a slow, relatively steady, decline in church attendance all through the 20th century. One interesting fact that shows up is that church attendance seems to decline rather steadily for the mothers and fathers, and relatively sharply somewhere in the 1960s for the children, which we take as evidence of a "religious crisis in the 1960s" (Brown, 2001, Gärtner, 2018, McLeod,

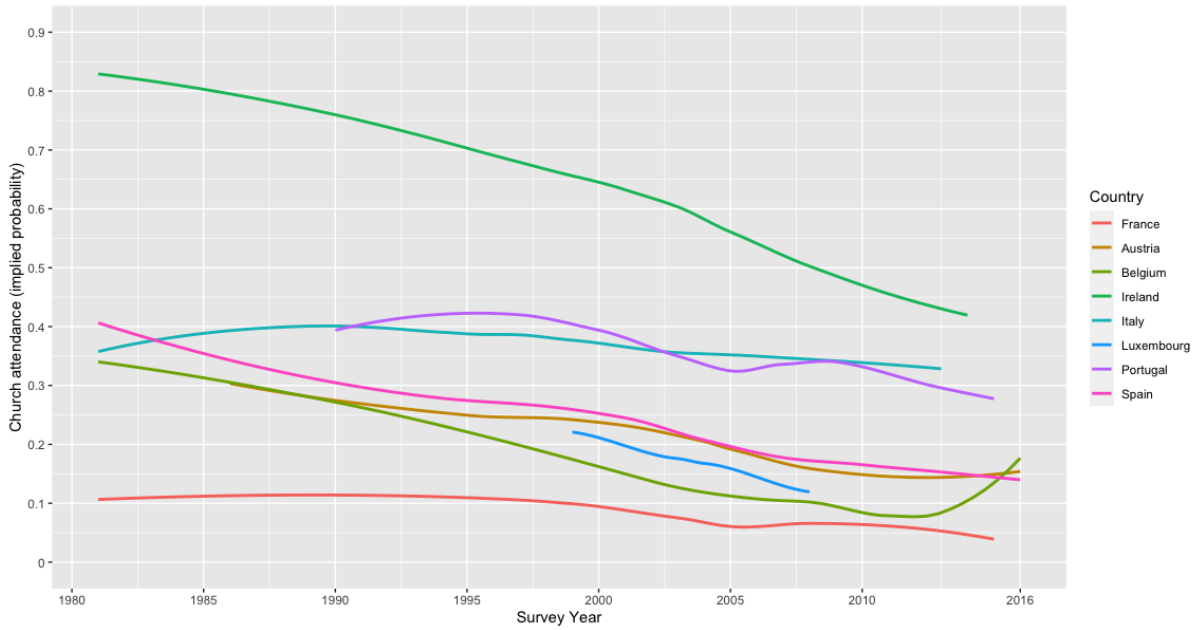
2007). This crisis shows up less clearly in the parents' indicators, because the parents of children of a certain age do not all belong to the same cohorts.

Figure 1 Percentage of religiously affiliated individuals in Catholic countries in Western Europe



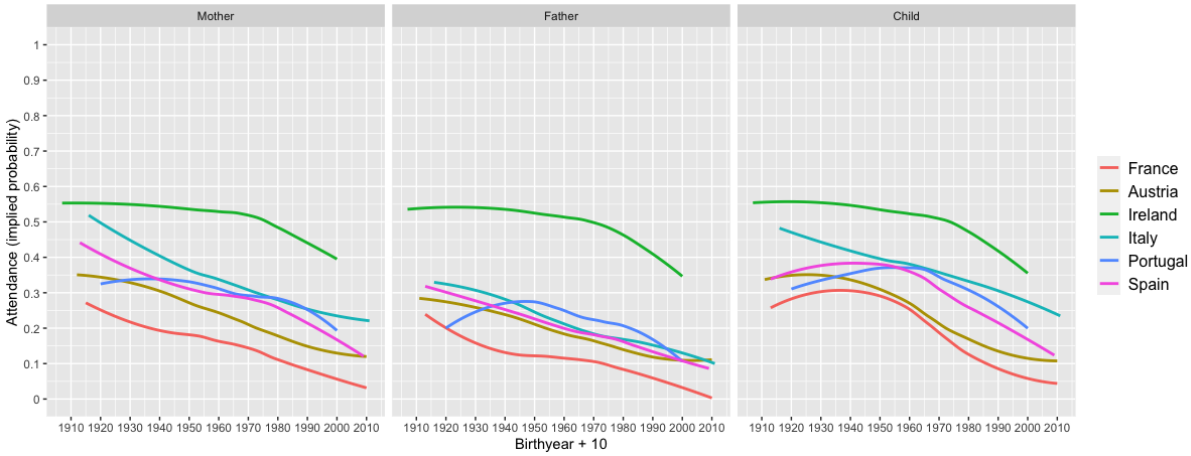
Note: CARPE data.

Figure 2 Mean church attendance in Catholic countries in Western Europe



Note: CARPE data.

Figure 3 Implied probability of church attendance of the mother, the father, and the respondent when the respondent was a child, in Catholic countries in Western Europe (retrospective data)



Note: Pooled ISSP data.

4.2 Is France an exception to the cohort-replacement mechanism?

Having established that France has a significantly lower level of religiosity than all other Catholic countries in Western Europe (except Belgium in terms of religious affiliation), we now turn to our second question regarding the main mechanism responsible for this low level. Can secularization in France be ascribed mainly to cohort replacement, as it can be in the case of most other Western countries?

One of the simplest but most effective ways of judging the importance of cohort replacement is to examine the question by means of graphs and by looking at the variable aggregates of interest in religion that different cohorts show over time. Figure 4 depicts the aggregate religious affiliation of seven cohorts over time. For example, the likelihood that those belonging to the cohort born between 1921 and 1930 were as children affiliated to a religion was about 0.7, a figure that remained roughly the same over time until 2015 (0.68), when our observation window for this cohort ended – because the members of this cohort had either died or were too old to take part in the survey. To take another example, those belonging to the cohort born in 1981-1990 appear in our dataset in 2003, and have an aggregate probability of church attendance of about 0.3, a figure that seems to remain constant until the end of our period of observation in 2016.

Figure 4 shows two things quite clearly. First, every new generation has a lower aggregate level of religious affiliation than the previous. Much of the overall decline in religious affiliation is therefore due simply to cohort replacement. Second, there seems to have been a period effect somewhere around 2000 that caused a “fanning-out” of religious affiliation. While older cohorts largely retained their affiliation, the aggregate level of religious affiliation among the younger generations fell.

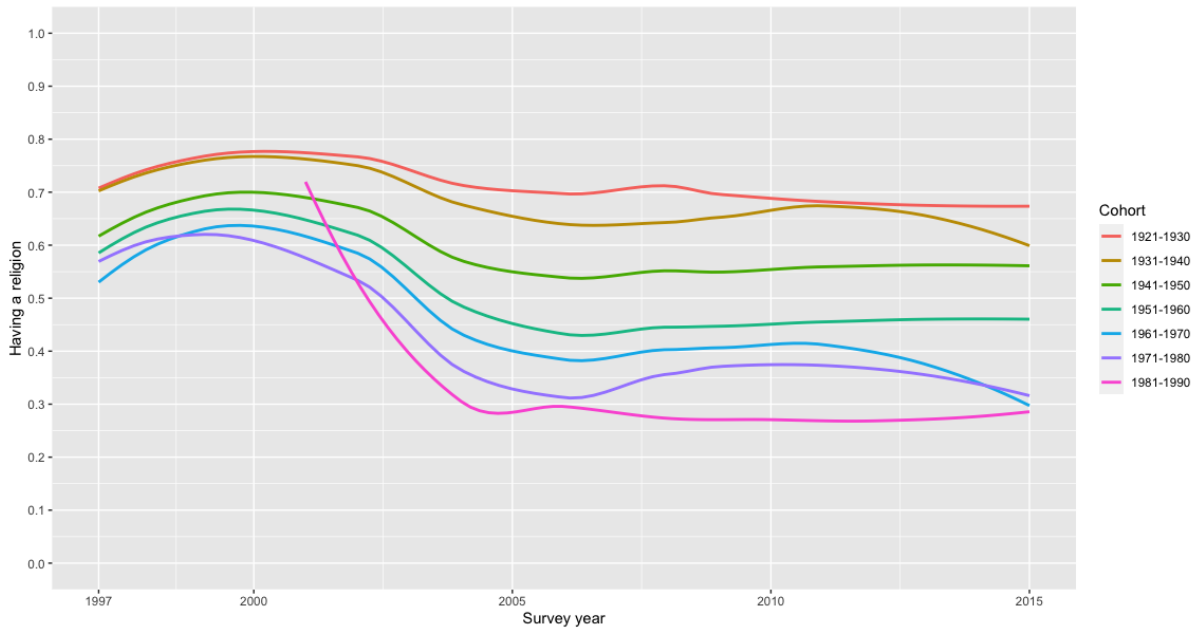
Figure 5 depicts church attendance. Again, we can see a very strong effect of cohorts. Every new cohort starts out from a slightly lower level than the previous one, and on aggregate stays at the same level over time. We can also see that the last four cohorts – those born in the 1950s and after – become increasingly close to each other over time. This might be interpreted as a

“bottoming-out” in the sense that church attendance might have reached a plateau that it is not likely to go below in the future (Burkimsher, 2014). Note also that France was already at a relatively low level in the 1970s, as the following comparisons will show. It might be tempting to see a lifecycle effect in the data for the cohorts born in 1921-1930 and 1931-1940, since their church attendance fluctuates somewhat. However, we should be circumspect here, since these fluctuations are probably due to sampling errors.

The cohort effects are not just a matter of affiliation and attendance, but also show up in almost all other indicators for Christian religiosity. To show this, we have to turn from our harmonized CARPE dataset (that only included affiliation and attendance) to one of the smaller original datasets. We chose ISSP. For lack of space, we can only show the effects in Figure 6 when it comes to belief in God, but the same is true for practices such as prayer or beliefs such as the belief in the holy status of the Bible (shown in the Appendix, Figures A1 and A2).

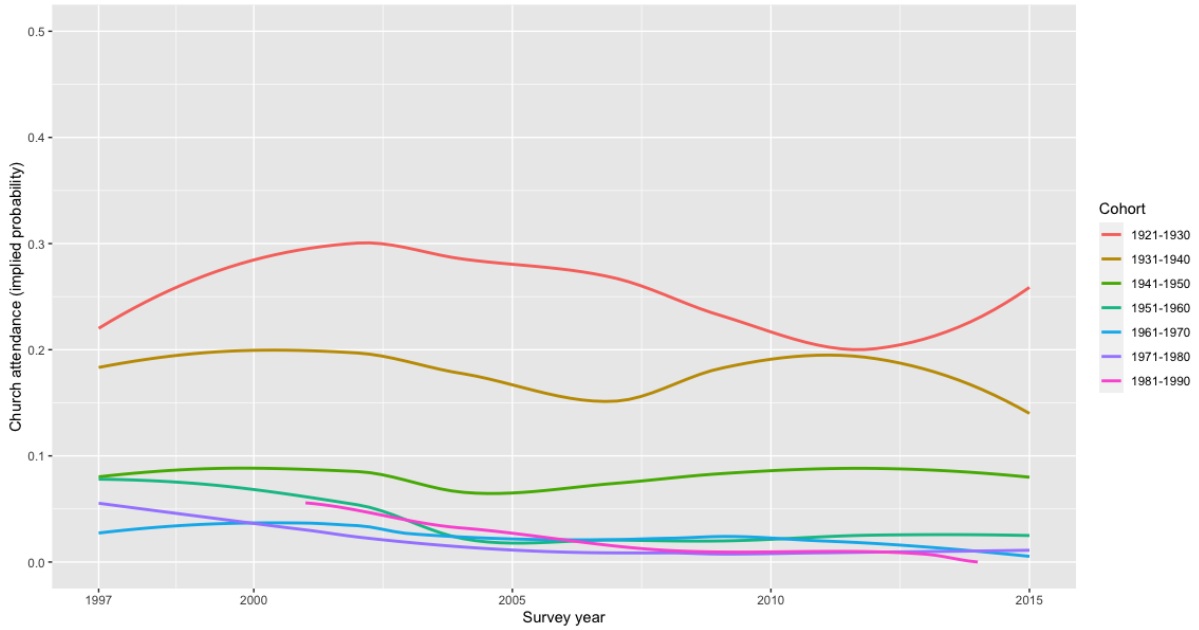
Demonstrating the cohort replacement effect only with ISSP data is useful for a second reason: here, we have many more control variables. We can thus test whether or not the cohort replacement mechanism is robust when we control for variables such as education, sex, or political preference. Might it be that the cohort-replacement mechanism plays out differently for different groups created by these variables? A test with only ISSP data for France shows that this is not the case. Just as in other countries, cohort replacement with regards to religiosity in France is a very robust phenomenon.

Figure 4 Religious affiliation in France according to survey year and cohort



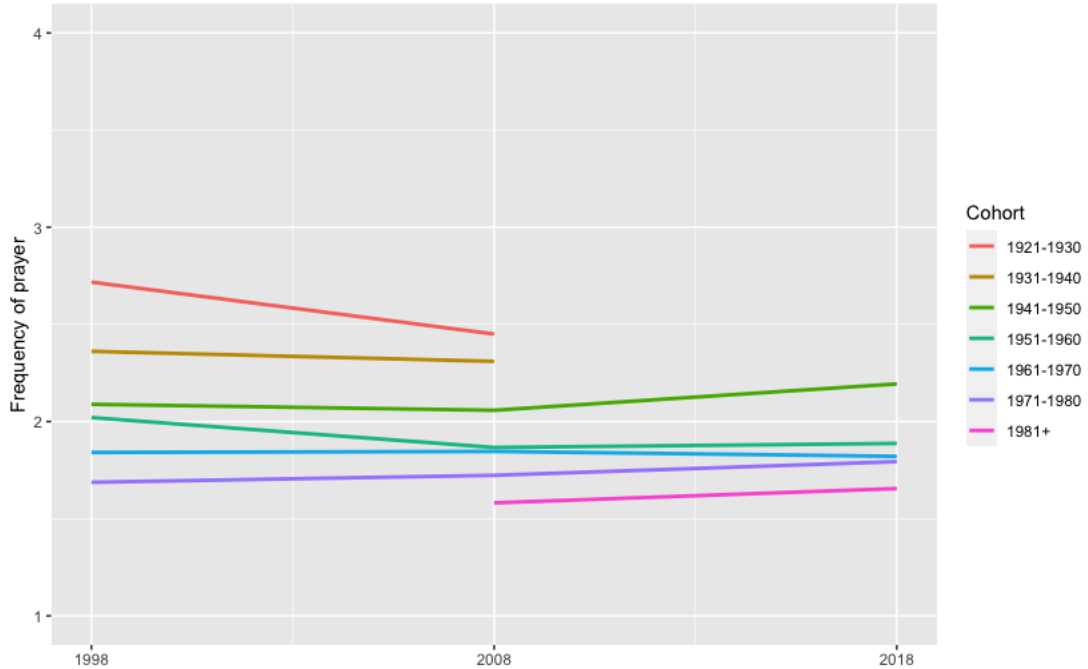
Note: CARPE data (only ISSP and ESS).

Figure 5 Church attendance in France according to survey year and cohort



Note: CARPE data.

Figure 6 Belief in God in France according to survey year and cohort



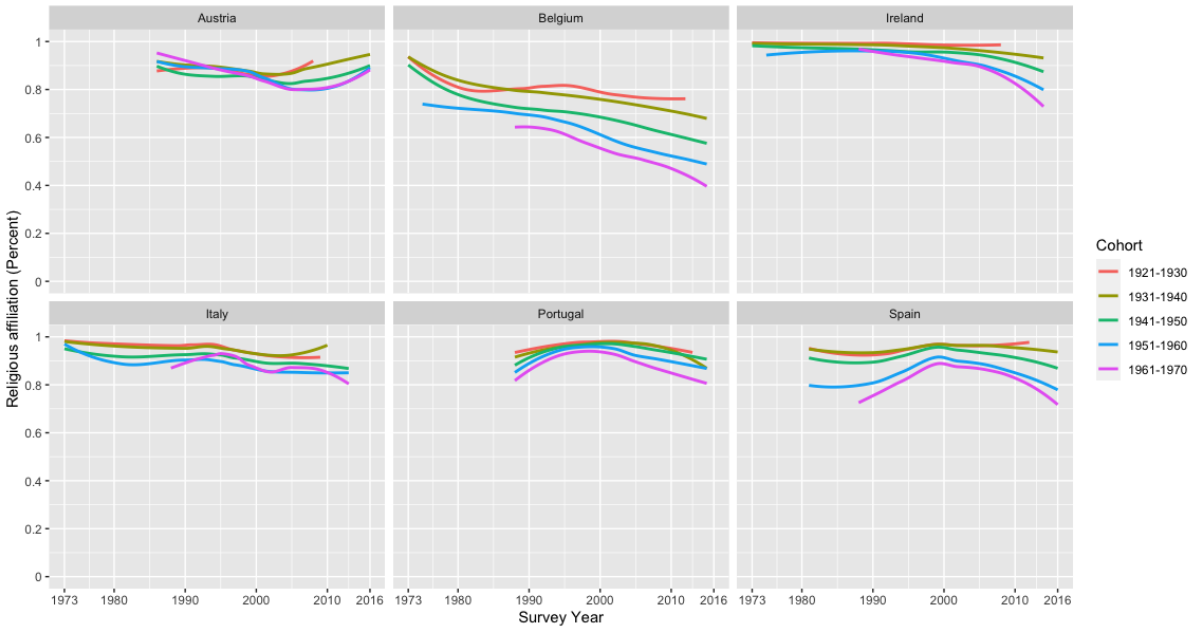
Note: ISSP data.

How does France compare with other Catholic countries in Western Europe regarding the cohort effect? From Figure 7, which depicts religious affiliation and cohorts over time, we can see that most other Catholic countries show a cohort effect in that every younger cohort shows a slightly lower aggregate level of religious affiliation than the previous, although the effect is still rather small. It is strongest in Belgium, where we can clearly observe not just a cohort effect (which would imply horizontal lines), but also a period effect (visible in declining lines). Thus, in Belgium, individuals lose their affiliation even during their adult lives. In several countries (Belgium, Ireland, Portugal), we can see again instances of the "fanning-out effect"

that we already observed for France. In other words, a situation in which everybody has a religious affiliation turns into a situation where the cohorts are clearly differentiated, with younger cohorts having a lower probability of religious affiliation.

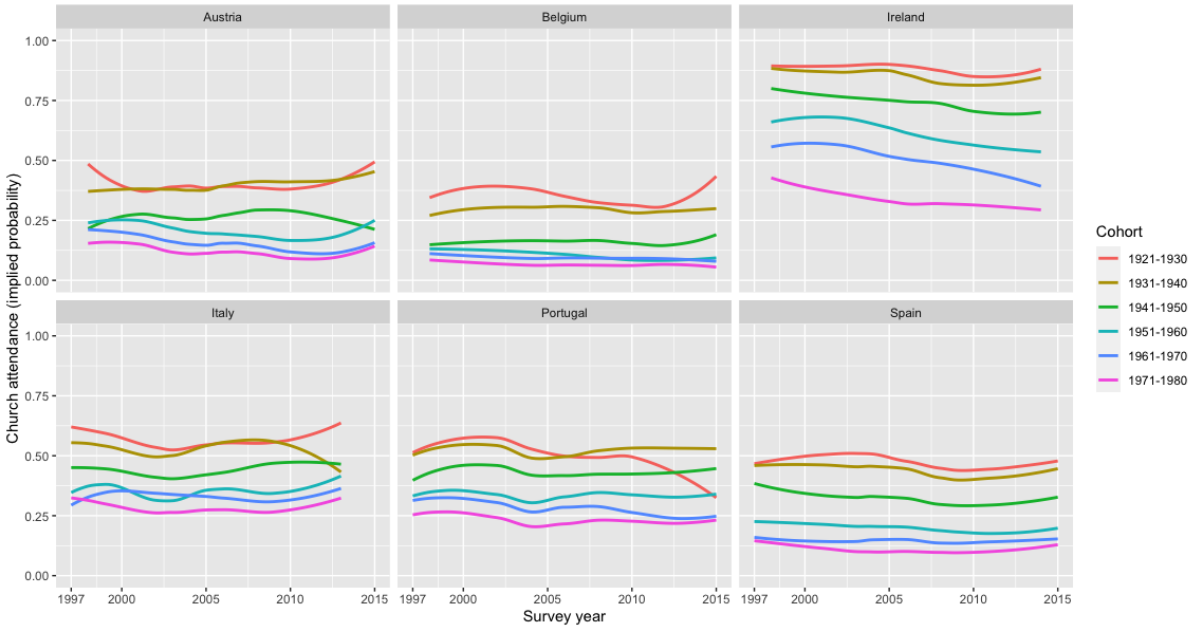
Figure 8 depicts church attendance and cohorts over time in other Catholic countries in Western Europe. The importance of the cohort effect is striking. The lines representing the probability of implied church attendance are virtually straight in all countries, showing again the expected order of cohorts. While the overall level of church attendance of the different cohorts in different countries varies, the pattern of the cohorts is identical. Declining church attendance in these countries since 1997 is clearly almost entirely a question of cohort replacement. In comparison to France, we can see that the bottoming-out effect is not yet as strongly advanced in most Catholic countries, but has clearly already started everywhere except for Ireland.

Figure 7 Religious affiliation in other Catholic countries in Western Europe according to survey year and cohort



Note: CARPE data. Lines are created with local regressions ("LOESS").

Figure 8 Church attendance in other Catholic countries in Western Europe according to survey year and cohort



Note: CARPE data. Lines are created with local regressions ("LOESS").

Having graphically shown the importance of cohort replacement, we now turn to statistical models estimating the size of the effects. Table 3 shows the results of a decomposition approach as described in the methods section for church attendance in Catholic countries. The aggregate change in church attendance is given in columns (5) and is partitioned into an individual-change component in column (10) and a cohort-replacement component in column (11). Ideally, columns (10) and (11) would add up to the aggregate change (5). As we can see, this works relatively well in most cases, but there are deviations, suggesting some nonlinearities in the data. For France, we can see an aggregate change of -20.0% in church attendance, partitioned into a large cohort-replacement effect of -14.1% and a very small individual-change component of -0.4%. It also means that the decrease in aggregate church attendance in France is attributed wholly to cohort effects, and that there are certain nonlinearities in the data, since our effects do not add up nicely to the overall aggregate change. In Austria, an aggregate effect of -13.0% is partitioned into a cohort-replacement effect of -14.6% and an individual-change effect of 0.5%. In all countries, the cohort-replacement effect is stronger than the individual effect. However, the individual effect is quite strong in Belgium, Ireland, Italy, and Luxembourg. Notably, in Italy we find a cohort effect (-20.9) and an individual effect (+11.6) that do not add up to the aggregate change (-20.0). It likely depends on the linear assumption of the decomposition model that is not met by the Italian case. In fact, the overall decline in church attendance rate that we observe for this country since the 1970s was broken by a temporary period of stability in the 1990s (Vezzoni and Biolcati, 2015).Our results therefore show that declining church attendance in some countries *not only* takes the form of cohort replacement, but may also be caused in part by individual change.

Table 3 Decomposition of aggregate trends regarding church attendance: individual change and cohort replacement

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Country	*Start year*	*End year*	*Start percent*	*End percent*	*Aggre-gate change*	*Length of period*	*Difference mean birthyear*	*Within slope*	*Between slope*	*Individual change*	*Cohort-replace-ment change*
France	1973	2015	28.0	8.0	-20.0	42	29.09161	-0.00009	-0.00486	-0.4	-14.1
Austria	1986	2016	32.0	19.0	-13.0	30	27.20271	0.00018	-0.00536	0.5	-14.6
Belgium	1973	2016	50.0	10.0	-40.0	43	37.13597	-0.00356	-0.00559	-15.3	-20.8
Ireland	1973	2014	96.0	46.0	-50.0	41	31.71093	-0.00505	-0.00825	-20.7	-26.1
Italy	1973	2013	55.0	35.0	-20.0	40	31.6942	0.00291	-0.0066	11.6	-20.9
Luxembourg	1973	2010	52.0	21.0	-31.0	37	26.53746	-0.00372	-0.00624	-13.8	-16.6
Portugal	1988	2015	42.0	31.0	-12.0	27	16.66346	-0.00089	-0.00592	-2.4	-9.9
Spain	1981	2016	43.0	16.0	-27.0	35	25.75033	-0.00157	-0.00764	-5.5	-19.7

5. Discussion

In this article, we have asked two simple questions: To what extent is France less religious than other Catholic countries in Western Europe when we take a longitudinal perspective? And is France secularizing in a similar way to Western countries in general, i.e. by means of cohort replacement? Our answers are straightforward. First, France is indeed "exceptional" in the sense that it is significantly less religious in terms of aggregate church attendance, belief in God, and religious belonging, than other Catholic countries in Western Europe (with the exception of Belgium when it comes to religious affiliation). This difference is not new but can be observed by means of retrospective data since the 1910s and with self-reports on items measuring religious belief and practice since the 1970s. We can therefore verify hypothesis 1. One interesting fact with regard to aggregate church attendance is that the gap between the other Catholic countries and France has narrowed in the last few decades, since irreligiosity in France might be "bottoming out".

As to our second question, the mechanism of secularization observable in France is not exceptional, but very similar to almost all other Catholic countries in Western Europe (with the possible exception of Ireland, and, to a lesser extent, Italy). France is losing its aggregate religiosity mainly through cohort replacement. In other words, we cannot explain France's irreligiosity by pointing to specific causes linked to France in the last 40 years (such as specific French policies or the specific enactment of the ideology of laïcité). If we assume that the stable decline shown in our retrospective data is also caused by cohort replacement, then we can even say that France's secularization over the last 100 years or so has not been exceptional. Thus, France's low aggregate level of irreligiosity today should be explained by the fact that France began the secular transition earlier or from a lower level than other Catholic countries in Western Europe. We can therefore verify hypothesis 2a (cohort replacement), but falsify hypothesis 2b (period effect).

Of course, this article has certain limitations. We have looked only at indicators of Christian religiosity and have omitted an analysis of more individualized beliefs, alternative spirituality, and non-Christian groups (Champion, 2001, Hervieu-Léger, 1999, Hervieu-Léger, 2001). On the basis of research on religion both in France and in other Western countries, however, we can say that non-Christian religions and alternative spirituality certainly do not compensate for the strong secularization of Western countries (Bréchon, 2014, Stolz, Könemann, Schneuwly Purdie, Englberger and Krüggeler, 2016, Voas and Bruce, 2007).[xxi] Our findings are also limited by the available data: our assertions about church attendance before the 1970s are based only on retrospective data that may be more prone to bias (for a discussion, see Franck and Iannaccone, 2014). Finally, while we have shown that the current French irreligiosity is mainly a product of the past, it remains an open question whether France started the secular transition earlier or from a lower level than other countries (or both) .[xxii]

One of the functions of the analysis of "critical" or "exceptional" cases in the social sciences is to test whether a given theory allows to explain even these seemingly difficult instances of observations. Scientific progress of a research programme often takes the form of researchers showing that their theory is able to explain also what had hitherto been seen as "exceptions" or "anomalies"(Lakatos, 1978). Alternatively, exceptional cases may reveal new facts and relationships that force researchers to revise their theories (Ermakoff, 2014). In this paper, we have shown that the "exceptional irreligiosity" of France is perfectly compatible with the cohort replacement theory. Our article is another strong confirmation of the idea of a "secular

transition" (Brauer, 2018, Stolz, Pollack and De Graaf 2020, Voas, 2008), which claims that countries or regions enter a secular transition (much like the demographic transition) and then slowly secularize through cohort replacement. France is indeed very – and perhaps even "exceptionally" – irreligious, but the roots of this phenomenon are not due to causes specific only to France, at least not in the last century. Rather, the cause for the current differences in religiosity are just transpositions – by cohort replacement – of similar differences in religiosity at a higher level in the past. In this sense, France is a country whose exceptional irreligiosity has non-exceptional causes.

Literature

Amir-Moazami, S. (2007).Laïcité à la française: Die verschiedenen Gesichter eines politisch-sozialen Begriffs *In* Amir-Moazami, S. (Ed.), *Politisierte Religion*. Bielefeld: Transcript Verlag, 89-101.

Baubérot, J. (2004b). *Laïcité 1905-2005, Entre Passion et Raison*. Paris: Seuil.

Baubérot, J. (2013). Sécularisation, Laïcité, Laïcisation, *ERES "Empan"*, **90**, 31-38.

Baubérot, J. (2014).Laïcité and freedom of conscience in pluricultural France *In* Berlinerblau, J., Fainberg, S. and Nou, A. (Ed.), *Secularism on the Edge. Rethinking Church Stat Relations in the United States, France and Israel*. Palgrave: MacMillan, 103-111.

Baubérot, J. (2017). *Histoire de la laïcité en France. 7ème édition*. Paris: PUF.

Baudouin, J. and Portier, P. (2001). *La laïcité, une valeur d'aujourd'hui? Contestations et renégociations du modèle français*. Presses universitaires de Rennes.

Beckford, J. A. (2004)."Laïcité," "Dystopia," and the Reaction to New Religious Movements in France *In* Richardson, J. T. (Ed.), *Regulating Religion*. Boston, MA: Springer, 27-40.

Bell, A. and Jones, K. (2014). Another "futile quest"? A simulation study of Yang and Land's Hierarchical Age-Period-Cohort model, *Demographic Research*, **30**, 333-360.

Biolcati, F., Molteni, F., Quandt, M. and Vezzoni, C. (2020). Church Attendance and Religious change Pooled European dataset (CARPE): a survey harmonization project for the comparative analysis of long-term trends in individual religiosity, *Quality & Quantity*.

Bobineau, O. (2012). La spécificité du régime français de laïcité. Grilles de lecture à partir des sciences humaines, *Revue d''éthique et de théologie morale*, **269**, 49-74.

Boulard, F. and Rémy, J. (1968). *Pratique religieuse urbaine et régions culturelles*. Paris: Ed. ouvrières.

Brauer, S. (2018). The Surprising Predictable Decline of Religion in the United States, *Journal for the scientific study of religion*, **57**, 654-675.

Bréchon, P. (2000). Les attitudes religieuses en France: quelles recompositions en cours?, *Archives de sciences sociales des religions*, **109**, 11-30.

Bréchon, P. (2014).Le croire religieux des Français d'après les enquêtes ISSP *In* Aubin-Boltanski, E., Lamine, A.-S. and Luca, N. (Ed.), *Croire en actes. Distance, intensité ou excès?* Paris: L'Harmattan, 99-115.

Bréchon, P. (2018). La transmission des pratiques et croyances religieuses d'une génération à l'autre, *Revue de l'OFCE, Presses de Sciences Po, Aspects des transmissions familiales entre générations*, **2**, 11-27.

Bréchon, P., Gonthier, F. and Astor, S. (2019). *La France des valeurs. Quarante ans d'évolutions*. Grenoble: Presses universitaires de Grenoble.

Brown, C. G. (2001). *The Death of Christian Britain. Understanding Secularisation 1800-2000*. London: Routledge.

Bruce, S. (2002). *God is Dead: Secularization in the West*. Oxford: Blackwell.

Burkimsher, M. (2014). Is Religious Attendance Bottoming Out? An Examination of Current Trends Across Europe, *Journal for the scientific study of religion*, **53**, 432-445.
Champion, F. (2001). Univers mystique-ésotérique et croyances parallèles, *Futuribles*, **260**, 49-60.
Chenu, A. (2011). Les enquêteurs du dimanche. Revisiter les statistiques françaises de pratique du catholicisme (1930-1980), *Histoire & Mesure*, **XXVI**, 177-221.
Cleveland, W. S. (1979). Robust Locally Weighted Regression and Smoothing Scatterplots, *Journal of the American Statistical Association*, **74**, 829-836.
Crockett, A. and Voas, D. (2006). Generations of Decline: Religious Change in 20th-Century Britain, *Journal for the scientific study of religion*, **45**, 567-584.
Dargent, C. (2010).La fille aînée de l'église dans l'isoloir. Religion et politique en France et en Europe *In* Boy, D. (Ed.), *Les Français, des Européens comme les autres?* Paris: Presses de Sciences Po, 181-214.
De Graaf , N. D. (2013).Secularization: Theoretical Controversies Generating Empirical Research *In* Wittek, R., Nee, V. and Snijders, T. A. B. (Ed.), *Handbook of Rational Choice Social Research*. Stanford: Stanford University Press, 322-354.
Dobbelaere, K. (2002). *Secularization: An Analysis at Three Levels*. Bruxelles: Peter Lang.
Ermakoff, I. (2014). Exceptional Cases: Epistemic Contributions and Normative Expectations, *European Journal of Sociology*, **55**, 223-243.
Fath, S. (2005). *Du ghetto au réseau. Le protestantisme évangélique en France 1800-2005*. Genève: Labor et Fides.
Fath, S. and Willaime, -. J.-P. (2011). *La nouvelle France protestante. Essor et recomposition au XXIe siècle*. Genève: Labor et Fides.
Firebaugh, G. (1989). Methods for Estimating Cohort Replacement Effects, *Sociological Methodology*, **19**, 243-262.
Fox, J. and Weisberg, S. (2018). *Nonparametric Regression in R. An Appendix to An R Companion to Applied Regression, third edition (PDF)*. SAGE. ISBN 978-1-5443-3645-9.
Franck, R. and Iannaccone, L. R. (2014). Religious decline in the 20th century West: Testing alternative explanations, *Public Choice*, **159**, 385-414.
Gärtner, C. (2018).Die normative Krise der 1960er Jahre: Der Wandel von Familie, Geschlechterverhältnis und Sexualität *In* Gärtner, C., Gutmann, T., Mesch, W. and Meyer, T. (Ed.), *Normative Krisen*. Tübingen: Mohr Siebeck, 161-193.
Glenn, N. D. (1976). Cohort Analysts´ Futile Quest: Statistical Attempts to Separate Age, Period and Cohort Effects, *American Sociological Review*, **41**, 900-904.
Hébel, P. and Recours, F. (2007). Effets d'âge et de génération: transformation du modèle alimentaire, *Cahiers de Nutrition et de Diététique*, **42**, 297-303.
Hervieu-Léger, D. (1999). *Le pèlerin et le converti*. Paris: Flammarion.
Hervieu-Léger, D. (2001). *La religion en miettes ou la question des sectes*. Paris: Calmann-Lévy.
Hout, M. and Greeley, A. (1998). What church officials' reports don't show: Another look at church attendance data, *American Sociological Review*, **63**, 113-119.
Hunter-Henin, M. (2012). Why the French don't like the burqa: laïcité, national identity and religious freedom, *The International and Comparative Law Quarterly*, **61**, 613-639.
Isambert, F.-A., Terrenoire, J.-P. and Boulard, F. (1980). *Atlas de la pratique religieuse des catholiques en France*. Paris: CNRS.
Lakatos, I. (1978). *The methodology of scientific research programmes. Philosophical Papers Vol. 1*. Cambridge: Cambridge University Press.

Lambert, Y. (1994).La religion: un paysage en profonde mutation *In* Riffaut, H. (Ed.), *Les Valeurs des Français*. Paris: PUF, 123-162.
Lambert, Y. (1995). Vers une ère postchrétienne?, *Futuribles*, **200 Juillet-Août**, 85-111.
Le Bras, G. (1955). *Etudes de sociologie religieuse*. Paris: PUF.
Le Bras, G. (1976). *L'Eglise et le village*. Paris: Flammarion.
Lipset, M. S. and Rokkan, S. (1967). *Party Systems and Voter Alignments: Cross-National Perspectives*. The Free Press.
Maître, J. (1961). Les sondages sur les attitudes religieuses des Français, *Revue française de Sociologie*, **2-1**, 14-29.
Martin, D. (1978). *A General Theory of Secularization*. New York: Harper & Row.
Martin, D. (1991). The secularization issue: prospect and retrospect, *British Journal of Sociology*, **42**, 465-474.
McClendon, D. and Hackett, C. (2014). When people shed religious identity in Ireland and Austria: Evidence from censuses, *Demographic Research*, **31**, 1297-1310.
McLeod, H. (2000). *Secularisation in Western Europe, 1848-1914*. New York: St. Martin's Press.
McLeod, H. (2007). *The Religious Crisis of the 1960s*. Oxford: Oxford University Press.
Michel, P. (2010). La laïcité française, *Amérique Latine Histoire et Mémoire. Les Cahiers ALHIM*, **20**, 1-10.
Molteni, F. (2021). *A Need for Religion. Insecurity and Religiosity in the Contemporary World*. Leiden/Boston: Brill.
Norris, P. and Inglehart, R. (2012 (2004)). *Sacred and Secular. Religion and Politics Worldwide. Second edition*. Cambridge: Cambridge University Press.
Pelletier, D. (2019). *Les catholiques en France de 1789 à nos jours*. Paris: Albin Michel.
Pelzer, B., Grotenhuis, M. t., Eisinga, R. and Schmidt-Catran, A. W. (2015). The Non-uniqueness Property of the Intrinsic Estimator in APC Models, *Demography*, **52**, 315-327.
Pollack, D. and Rosta, G. (2017). *Religion and Modernity. An International Comparison*. Oxford: Oxford University Press.
Portier, P. (2016). *L'Etat et les religions en France. Une sociologie historique de la laïcité*. Rennes: Presses Universitaires de Rennes.
Portier, P. and Willaime, J.-P. (2021). *La religion dans la France contemporaine*. Paris: Armand Colin.
Ryder, N. B. (1965). The Cohort as a Concept in the Study of Social Change, *American Sociological Review*, **30**, 843-861.
Stoetzel, J. (1983). *Les Valeurs du temps présent*. Paris: PUF.
Stolz, J. (2020a). Secularization theories in the 21st century: Ideas, evidence, problems. Presidential address, *Social Compass*, **67**, 282-308.
Stolz, J., Könemann, J., Schneuwly Purdie, M., Englberger, T. and Krüggeler, M. (2016). *(Un)Believing in modern society. Religion, spirituality, and religious-secular competition*. London: Routledge.
Stolz, J., Pollack, D. and De Graaf , N. D. (2020). Can the State accelerate the Secular Transitition? Secularization in East- and West Germany as a Natural Experiment, *European Sociological Review*, **36**.
Tocqueville, A. d. (1835/40 (1981)). *De la démocratie en amérique*. Paris: Garner-Flammarion.
Vezzoni, C. and Biolcati, F. (2015). Church Attendance and Religious Change in Italy, 1968-2010: A Multilevel Analysis of Pooled Datasets, *Journal for the scientific study of religion*, **54**, 100-118.

Voas, D. (2008).The Continuing Secular Transition *In* Pollack, D. and Olson, D. V. A. (Ed.), *The Role of Religion in Modern Societies*. New York: Routledge, 25-48.
Voas, D. and Bruce, S. (Eds.) (2007).The Spiritual Revolution: Another False Dawn for the Sacred *In* Flanagan, K. and Jupp, P. C. (Ed.), *A Sociology of Spirituality*: Ashgate, 43-62.
Voas, D. and Chaves, M. (2016). Is the United States a Counterexample to the Secularization Thesis?, *American Journal of Sociology*, **121**, 1517-1556.
Voas, D. and Crockett, A. (2005). Religion in Britain: Neither Believing nor Belonging, *Sociology*, **39**, 11-28.
Willaime, -. J.-P. (2009). Pour une sociologie transnationale de la laïcité dans l'ultramodernité contemporaine, *Archives de sciences sociales des religions*, **54e Année**, 201-218.
Willaime, J.-P. (1998). Religious and Secular France Between Northern and Southern Europe, *Social Compass*, **45**, 155-174.
Wolf, C. (2008). How secularized is Germany? Cohort and Comparative Perspectives, *Social Compass*, **55**, 111-126.
Yang, Y. and Land, K. C. (2013). *Age-period-cohort analysis: New models, methods, and empirical applications*. Boca Raton: CRC Press.
Zaretsky, R. (2016). How French Secularism Became Fundamentalist, *Foreign Policy*.
Zuber, V. (2017). *La Laïcité en débat: au-delà des idées reçues*. Le cavalier bleu.

Appendix

1. Descriptive information

Table A1 Descriptive information for CARPE dataset

Country	*Affiliation*	*Attendance*	*Age*	*Female*	*Range survey years*	*Number of surveys*	*n*
	Mean(sd)	*Mean(sd)*	*Mean(sd)*	*Mean(sd)*			
France	0.64(0.48)	0.12(0.27)	46.58(17.71)	0.53(0.5)	1973-2015	47	78,857
Austria	0.84(0.36)	0.24(0.36)	46.28(17.21)	0.55(0.5)	1986-2016	27	39,193
Belgium	0.64(0.48)	0.2(0.37)	44.89(17.67)	0.51(0.5)	1973-2016	34	57,287
Ireland	0.92(0.26)	0.69(0.43)	43.53(17.6)	0.53(0.5)	1973-2014	42	66,806
Italy	0.91(0.28)	0.41(0.44)	42.8(16.92)	0.53(0.5)	1973-2013	37	57,508
Luxembourg	0.84(0.37)	0.26(0.39)	42.85(17.41)	0.5(0.5)	1973-2010	23	19,235
Portugal	0.91(0.29)	0.37(0.43)	47.84(18.89)	0.57(0.5)	1988-2015	31	53,185
Spain	0.85(0.36)	0.26(0.39)	46.03(18.54)	0.53(0.5)	1981-2016	46	80,689
Total	0.81(0.39)	0.32(0.42)	45.3(17.91)	0.53(0.5)	1973-2016	287	452,760

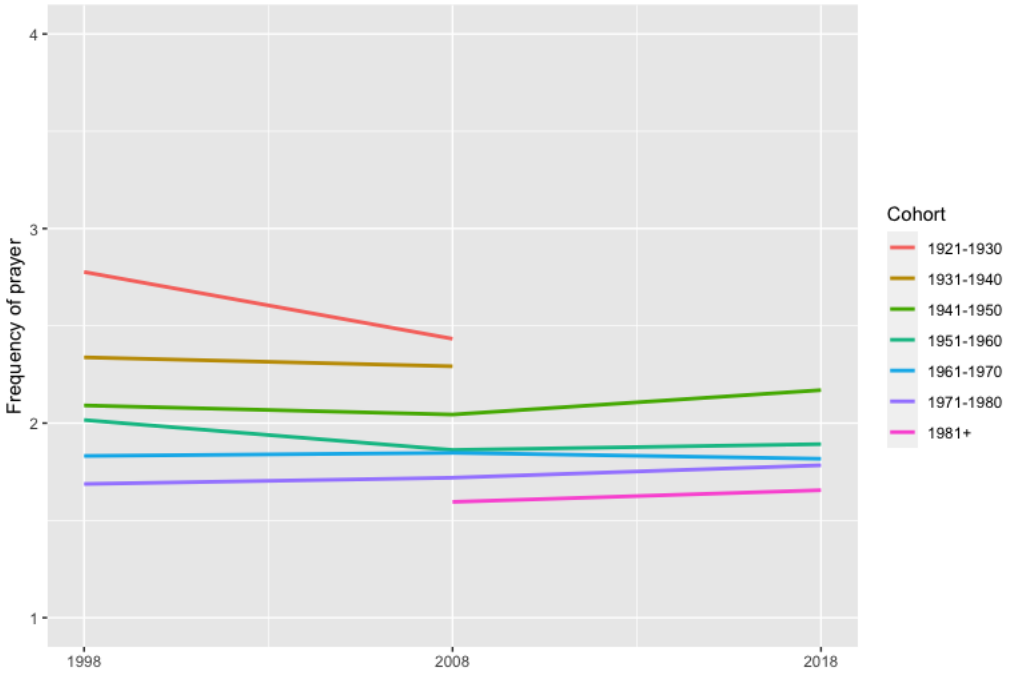
Table A2 Descriptive information for ISSP dataset

Country	*Belief in God*	*Church attendance mother*	*Church attendance father*	*Church attendance child*	*Age*	*Female*	*Range survey years*	*Number of surveys*	*n*
	Mean(sd)	*Mean(sd)*	*Mean(sd)*	*Mean(sd)*	*Mean(sd)*	*Mean(sd)*			
Austria	4(1.68)	4.25(1.61)	3.79(1.71)	4.51(1.45)	47.59(17.54)	0.56(0.5)	1991-2018	4	3516
France	3.39(1.83)	3.36(1.79)	2.82(1.75)	4.01(1.82)	51.16(17.23)	0.54(0.5)	1998-2018	3	3959
Ireland	5.01(1.32)	5.71(0.86)	5.6(1.04)	5.71(0.81)	45.53(17.42)	0.53(0.5)	1991-2008	3	3878
Italy	4.76(1.48)	4.84(1.49)	3.98(1.75)	5.19(1.23)	48.17(17.31)	0.51(0.5)	1991-2018	4	3854
Portugal	5.05(1.37)	4.65(1.56)	4.07(1.81)	4.88(1.5)	47.16(17.35)	0.59(0.49)	1998-2008	2	1997
Spain	4.34(1.77)	4.39(1.77)	3.6(1.92)	4.61(1.73)	47.05(18.04)	0.51(0.5)	1998-2018	3	5867
Total	4.37(1.71)	4.51(1.72)	3.93(1.9)	4.8(1.58)	47.78(17.62)	0.53(0.5)	1998-2018	19	23,071

2. Prayer and belief in the sacred status of the Bible

Frequency of prayer was recoded as 4 = daily; 3 = regularly, but not daily; 2 = a few times per year; 1 = never. Figure A1 shows the expected cohort effects.

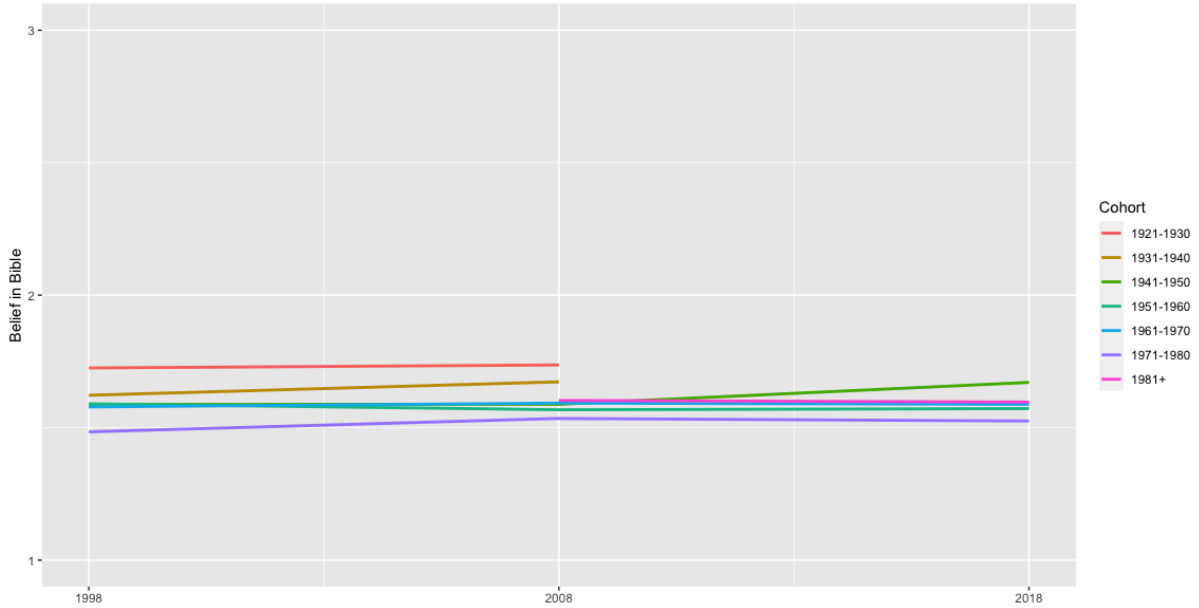
Figure A1 Frequency of prayer in France according to survey year and cohorts



Note: ISSP data

Belief in the sacred status of the Bible was operationalized in the following way: 3 = the Bible is the actual word of God, to be taken literally: 2 = the Bible is the inspired word of God, and not everything should be taken literally; 1 = the Bible is an ancient book of legends and moral precepts recorded by man. Figure A1 shows the usual cohort differences, although they are quite small and the youngest generation shows higher values than would be expected. In general, the French population is on average only prepared to see the Bible as a text that should not be interpreted literally.

Figure A2 Belief in the sacred status of the Bible in France according to survey year and cohorts



Note: ISSP data

---

[i] We thank Jean Baubérot, Pierre Bréchon, Claude Dargent, Christophe Monnot, Philippe Portier, and Jean-Paul Willaime as well as the reviewers of L'Année sociologique for their very useful comments and suggestions. All remaining errors are of course ours.

[ii] Tocqueville (1835/40 (1981)) already observed that Americans went to church much more often than the French when he travelled around the colonies.

[iii] The term "secularization" can have different meanings and may be applied to different levels of social reality. Obviously, it presupposes a certain definition of religion and religiosity (Bruce, 2002, De Graaf 2013, Dobbelaere, 2002). In this article, we take secularization to mean simply a decline in religiosity. We define religion as combining (1) an ideology referring to a transcendent (i.e. supernatural) reality, (2) a social group or groups producing and transmitting this ideology, (3) the individual experiences, beliefs, and actions referring to the ideology. Religiosity subsumes individual experiences, beliefs, and actions belonging to one or several religion(s). Examples of individual religiosity as defined here include attending church service or a meditation course, praying, going on a pilgrimage, and believing in angels (Stolz, 2020a).

[iv] We use "cohort" as a shorthand for "birthyear cohort". For this article, we use the terms "cohort" and "generation" interchangeably

[v] The high *n* makes measurement unprecedentedly precise even in a longitudinal perspective, leading to a robustness of results that would not be possible otherwise. However, these advantages come at a price: namely, the only indicator of religiosity that we can consider is church attendance, since this is the only dependent variable that can be harmonized in such a wide range of surveys. Having acknowledged that, we think of course that it is interesting to use church attendance to answer our questions, while leaving it to further studies to replicate the analysis with further indicators, such as religious belief, importance of religion, and spirituality.

[vi] Quantitative research on religiosity in France began earlier than international programmes such as EVS and ISSP. There are first surveys on Catholics in the 1940s, and there is the well-known survey project by Gabriel le Bras and Fernand Boulard (Boulard and Rémy, 1968, Isambert *et al.*, 1980, Le Bras, 1955, Le Bras, 1976) that began in 1945 and lasted until the end of the 1960s (Chenu, 2011, Maître, 1961).

[vii] However, not all religious change takes the form of cohort replacement. Researchers have found a number of exceptions. For one thing, cohort replacement does not explain all aspects of the decline in religiosity, but leaves

a more or less important place for individual "secular drift" (Stolz et al., 2016). This becomes very obvious in some countries, such as New Zealand (Voas and Chaves, 2016). Furthermore, the state may be able either to accelerate or decelerate secularization. For example, many individuals in East Germany were forced during the socialist regime to disaffiliate from the church. Likewise, church scandals and church tax seem to have led adults in Austria to disaffiliate at very different ages (McClendon and Hackett, 2014).

[viii] There are researchers who believe that the APC problem may be solved statistically. One of the latest and most well-known attempts is the cross-classified multi-level model by Yang and Land (2013). With Bell and Jones (2014) however, we think that the search for such statistical solutions is a futile quest. For an application of the APC model in a French context, see Hébel and Recours (2007).

[ix] For the first article using the CARPE dataset applied to the Italian case, see Vezzoni and Biolcati-Rinaldi (2015).

[x] The ISSP data can be downloaded at http://w.issp.org/menu-top/home/.

[xi] For mathematical reasons, individuals who go to church service every week are given 0.99 (instead of 1), and individuals who never go to church are given 0.01 (instead of 0) (Biolcati, Molteni, Quandt and Vezzoni, 2020).

[xii] These means should not be directly compared yet, since they may refer to somewhat different time periods depending on the countries. The graphs and multivariate analyses below will allow for a useful comparison.

[xiii] We imputed 8.3% of values in the attendance of the father, 6.0% in the attendance of the mother, and 2.0% in the attendance of the child.

[xiv] The data can be downloaded at https://www.gesis.org/issp/modules/issp-modules-by-topic/religion. The harmonized dataset that also included the data from 2018 was not yet available when this article was written. See, for specificities, the "Guide for the ISSP 'Religion' cumulation of the years 1991, 1998 and 2008 (ZA5070 and ZA5071)", downloadable at the same address (last accessed 28.4.2020).

[xv] We assume this variable with its range from 1 - 6 as being numerical and calculate means.

[xvi] We used the hotdeck function in R, as well as a linear imputation model for the church attendance of mother, father, and child (when the respondent was a child).

[xvii] See for the details as implemented in R: https://stat.ethz.ch/R-manual/R-devel/library/stats/html/loess.html (last accessed on 28.4.2021)

[xviii] We use the default span of 0.75.

[xix] For the mathematical background and an example of how loess-smoothing works in practice in R, see Fox and Weisberg (2018: 3f.).

[xx] This is, of course, arbitrary, but other choices would not substantially change the outcome.

[xxi] For a representative mixed methods study that includes both individualized or fuzzy religion and alternative spirituality in the case of Switzerland, see Stolz *et al*. (2016).

[xxii] There is an important historical literature on secularization in France and other western countries, see for example Baubérot (2017), Pelletier (2019), McLeod (2000), Portier (2016). We are not sure, however, whether the historical record and the availability of data from the past permit to well answer the very specific question we are posing here and leave the question to future research.