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Moving Away from Religion: Age, Cohort, or Period Effect? Evidence from a Longitudinal Survey in Switzerland

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Abstract: Since Voas and Crockett (2005), a consensus has emerged in the sociology of religions on the fact that secularization is largely due to a cohort effect. That is, each birth cohort is less religious than the previous one. We use data from the Swiss Household Panel (SHP), a multi-thematic survey based on a random sample representative of the general population since 1999, to understand what is the cohort effect in Switzerland on three indicators of religiosity: religious affiliation, frequency of religious service attendance, and personal prayer, taking into account the socio-demographic characteristics of individuals, which could interfere with cohort, period, or age effects. A first general observation can be drawn from the SHP: for the three religious indicators, a cohort effect is a key factor in explaining the decline of religiosity. Each birth cohort is less religious on all three indicators, that is, younger individuals are less affiliated, practice less often, and pray less than the older cohort. More subtly, we also observe an effect of age or life cycle, especially on the practice, and a period effect on the religious disaffiliation of individuals. Each birth cohort shows a more religious profile of individuals at the start of the cohort than at the end. There is, therefore, an initial movement of distancing from religion by birth cohorts, but this is further accentuated by a period effect for disaffiliation and sometimes accelerated and, at other times, slightly contained by a life-cycle effect.

Keywords: cohort effect; period effect; age effect; Switzerland; longitudinal study; secularization; affiliation; practice frequency; prayer

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1. Introduction

In the sociology of religions, a consensus is emerging: secularization is largely due to a cohort effect[1]. That is, each birth cohort proves to be less religious than the previous one. In the heavy trend observed toward secularization, at least for the historical Christian religion in the West, a heated debate discussed the possible effects of either age, period, or cohort to explain this process in the best possible way.

Since Voas and Crockett (2005), several studies have highlighted a cohort effect to account for the secularization process. However, the data from individual surveys do not allow solid measurement of the effects of life cycle, age, or period. To understand it, an analysis must be conducted from a longitudinal survey. In this paper, we use data from the Swiss House Panel (SHP), a survey that follows the same households and individuals between 1999 and 2018.

This paper will deliberate what the cohort effect in Switzerland is, based on three religiosity indicators: religious affiliation; religious attendance frequency; and personal prayer. It can also question the effects of age or period to explain this secularization. In order to answer these questions consistently, it is also necessary to consider individuals' socio-demographic characteristics, which could interfere with the cohort or age effects.

1.1. Religiosity and Birth Cohort: A Megatrend

Observing that older folks are more religious than young people, some could, at the very beginning of this century, remark that "Religion generally becomes more important

to people as they grow older", (Greeley 2003, p. xvi; see also Firebaugh and Harley 1991, p. 495). It has been established that people do not become more religious with age. Rather, it is because they belong to an older birth cohort that they become comparatively more religious than younger cohorts.

The first breakthrough was made with a study by Voas and Crockett (2005) and Crockett and Voas (2006). These authors made a striking demonstration, based on The British Household Panel Survey (BHPS), covering the 1991–2001 decade, that "Religious decline in 20th-century Britain was overwhelmingly generational in nature... more religious cohorts are replaced by younger, less religious ones." (Crockett and Voas 2006, p. 581).

Since then, the most convincing thesis currently to describe secularization in Western countries is the replacement by a less religious cohort of the previous more religious one. While the debate remains open as to the causes of this replacement (the effect of relativization by religious pluralization (Berger 1967), an increase in the general education level (Wilson 1978), the increase in living standards (Norris and Inglehart 2005), secular alternatives (Stolz 2010), etc.), we observe a deficit in religious transmission with a more struggling religious socialization at each new generation (Bruce 2002). We should, therefore, observe that each cohort has a lower religiosity, defined by affiliation, practice, and personal prayer, than the older cohorts. So far, analyses find a relatively stable level of religiosity within cohorts involving relatively weak age or period effects.

This paper proposes to extend the discussion on the decline in religiosity by birth cohorts, based on the SHP. Indeed, few studies have analyzed this effect from longitudinal studies, other than Crocket and Voas' seminal study. The succeeding studies have pointed to a cohort effect based on an aggregation of individual surveys (Molteni and Biolcati 2022, 2018; Stolz et al. 2021; Brauer 2018; Voas and Chaves 2016; Voas and Doebler 2011; Voas 2009; and Wolf 2008). The majority Christian religion in Western Europe, the USA, Canada, Australia, and New Zealand is undergoing a decline in religiosity by cohorts. So, for each generation, socialization and values are less determined by religious factors. The level of religiosity reached by the next cohort is always lower than by the older one. The differences observed in the population at the religious level are, thus, first explained by the fact of belonging to a birth cohort.

A recent analysis of Switzerland (Stolz and Senn 2022) shows the same phenomenon using CARPE data. While the analysis highlights a cohort effect, the authors note possible age effects, but the data are insufficient to measure it. Our analysis will not differ overall from these conclusions, but, through longitudinal data, it will shed light on the process. The dataset allows us to measure whether there are differences within cohorts, whether age or life cycles play their parts, or whether individual socio-demographic backgrounds can speed up or slow down the religious decline.

1.2. The Swiss Context

Switzerland is about average in Europe in terms of secularization: about a quarter of the population is officially disaffiliated. It is also worth noting the Swiss confederation's historically bi-denominational character, with its Catholic and Protestant cantons. Cantons' internal denominational homogeneity has remained high so that one observes (urban) Protestant cantons have a significantly lower practice than (rather rural) Catholic cantons. In addition, the various migration waves from southern Europe to predominantly Catholic countries since the 1960s have increased the number of Catholics in Switzerland, while the proportion of Protestants has been declining since the 1950s. Since the 1990s, a third "affiliation", alongside Protestants and Catholics, has been growing in numbers: disaffiliated people, the so-called "religion: none". As the other religious affiliations are very much in the minority, we will not take them into consideration in this analysis due to a lack of reliable data.

1.3. Data

We used data from the Swiss Household Panel (SHP), a multi-thematic survey based on a random sample representative of the general population, which annually interviews the same people since the age of 14, and have done so since 1999, 2004, or 2013, depending on whether they belong to the first, second, or third samples. We focus on people aged between 14 and 85, as the number of older people is very low and presents an obvious bias, since the survey is conducted only among people living outside elderly people's homes.

Data on religious practices and beliefs were collected annually from 1999 to 2009 and then every 3 years (2012, 2015, and 2018), in accordance with the questionnaire modularization.

Three dependent variables were used for this study. The first is religious affiliation and, more precisely, non-affiliation. Religious non-affiliation is operationalized by the following question, "Currently, what is your denomination or religion?", with the category "no denomination or religion" being set against the other response options.

Religious attendance is measured by the following question, "How frequently do you take part in religious services?", and includes the following response categories: "never", "only on occasions of family ceremonies", "only at religious celebrations", "religious celebrations and family events", "a few times a year", "about once a month", "every two weeks", "once a week", or "several times a week".

Personal prayer is measured by the following question, "How frequently do you pray on your own, apart from at church or within a religious community?", with the following response categories: "never", "a few times a year", "about once a month", "at least once a week", "daily or almost daily", or "several times a day". It should be noted that responses to these closed questions were coded into various categories by the interviewers themselves, without these categories being read by the respondents. Moreover, religious service attendance and prayer were dichotomized[2], with a cut-off point of at least a monthly frequency.

In our following sections' analyses, only age in years (at the end of the survey year) is variable for a given individual during his or her follow-up by the panel.

The other variables considered in our models, i.e., the birth cohort, gender, migratory status, household income bracket (tertiles), place of residence (urban/rural), level of education, and religious affiliation, are fixed for all observations regarding a given individual. Actually, their variation is relatively rare. Rather, the people sub-groups they belong to are interesting for our analyses. This goes without saying for birth cohort, gender, and migration status, which are invariant by nature.

As for migration status, the *jus sanguinis* principle prevails in Switzerland, with nationality being transmitted through the parents, regardless of the place of birth. We differentiated between native Swiss born to Swiss parents, newcomers (born abroad and not native Swiss), and second comers (born in Switzerland and not native Swiss).

The other variables considered are, nevertheless, likely to vary over time. They were set at a fixed rate for all of a given individual's observations in order to control the age effect for sub-groups, as defined by the above-mentioned variables.

For each individual, we considered (1) the average net annual household income, then divided into tertiles and (2) the higher level for the education level and a dichotomous value for rural (=0) and urban areas (=1), considering the information given at the first interview.

Regarding religious affiliation, we distinguished Protestants from (Roman) Catholics who declared this affiliation in each of their interviews for the analysis of religious attendance and prayer. With the exception of the study on non-affiliation, the other minority religious affiliations were not included in the model because of their high degree of heterogeneity[3].

2. Methods

We first present our analyses' data in graphical form in order to distinguish cohort effects from life-cycle effects. To verify this algebraically, we used two longitudinal analysis techniques, which allowed us to isolate intergroup variance and intragroup variance, which add up to the total variable and must be distinguished in our reasoning.

In order to isolate the intergroup variance and focus on the differences between individuals and, more specifically, on those belonging to different cohorts, we opted for binary logistic regressions measured by the generalized estimating equations (GEEs) (Zeger et al. 1988; Zeger and Liang 1986), which make it possible to take into account the correlation between the observations concerning the same individual. These models, described as "marginal" or relative to the entire population concerned, describe the general effect of each variable considered. They have the advantage of being simple and robust, especially with a large sample and a reduced number of missing data, which is the case here. Here is another element in the analysis: apart from individuals' ages, which vary from one observation to another, all the other elements concerning the same individual do not vary over time, so the choice of a mixed model would not have been relevant. Furthermore, with GEE models, there is no need to make hypotheses on the structure of residuals compared to other models. This makes it possible to manage the panel data with a dichotomous dependent variable. Many papers discuss the benefits of GEE models (Hubbard et al. 2010; Agresti [1990] 2013; Neuhaus 1992; Neuhaus et al. 1991).

To isolate the within-group variance, we used binary logistic regression models with fixed effects for the panel data (Greene 2017; Hosmer et al. 2013; Allison 2009; Chamberlain 1980), or within model, allowing us to handle the correlation between the observations of the same individual. Fixed effects estimates use only within-individual differences, essentially discarding any information about differences between individuals.

These models cannot calculate effects for variables that remain constant for an individual across time, such as cohort, gender, and other ones fixed over time. Interaction terms with these invariant variables may be estimated, though. Moreover, with fixed effects models, only those individuals for whom the dependent variable varies over the course of the observations are retained in the estimates.

3. Results

The following table (Table 1) provides a distribution and descriptive statistics of our data (% summing to 100% in the column). The number of cases varies according to the column, with a very high number of observations (100,149) for the study of affiliation, but a lower number for religious service attendance (58,931) and prayer (58,263), as we only retained Catholics and Protestants who declared this affiliation in each of their interviews[4]. We note that, on average, over the whole reporting period, 14% of the Swiss population declared no religious affiliation, while among Catholics and Protestants, 24% participate in religious services at least once a month, and 57% pray outside a church or religious community at least once a month.

Table 1. Distribution and descriptive statistics of used data (column % summing to 100% in column).

	No Religious Affiliation	Religious Attendance (Monthly)	Personal Prayer (Monthly)
n observations—with non missing cases on all variables	100,149	58,931	58,263
n individuals—with non missing cases on all variables	21,124	13,031	12,988
of which n observation—with variance on the dependent variable	14,545	17,570	22,517

Table 1. *Cont.*

	No Religious Affiliation	Religious Attendance (Monthly)	Personal Prayer (Monthly)
of which n individuals—with variance on the dependent variable	2002	2355	3211
no religious affiliation	14.2%		
religious practice (monthly)		24.2%	
personal prayer (monthly)			56.6%
1979 and after	19.9%	17.5%	17.6%
1969–78	13.4%	12.5%	12.5%
1959–68	22.4%	21.0%	21.1%
1949–58	18.6%	19.1%	19.1%
1939–48	14.3%	15.7%	15.6%
1929–38	8.4%	10.3%	10.2%
1928 and before	3.0%	3.9%	3.8%
men	44.7%	44.1%	44.2%
Protestant	31.6%	53.7%	53.5%
Roman Catholic	27.3%	46.3%	46.5%
Swiss by birth	85.8%	90.9%	90.9%
secondos—non swiss by birth, born in CH	3.7%	2.6%	2.6%
primos—non swiss by birth, born abroad	10.5%	6.5%	6.5%
1st tertile of annual household income—less than 87,000 CHF	35.2%	35.6%	35.5%
2nd tertile of annual household income—87,000–126,999 CHF	33.1%	33.4%	33.4%
3rd tertile of annual household income—127,000 CHF and above	31.7%	31.0%	31.1%
urban area	53.9%	54.0%	53.9%
primary school	15.3%	15.6%	15.6%
vocational training	47.3%	50.7%	50.7%
higher education	37.4%	33.7%	33.7%

It should also be noted that sample size allows for robust analysis, even of the most numerically marginal categories.

3.1. Non-Affiliation

The following graph (Figure 1) shows the proportion of religious non-affiliation among the population by cohort and by age. The figures show a double effect, firstly of cohorts, with each successive cohort tending to be less religiously affiliated, especially the youngest. There is a period effect, with nearly every cohort losing affiliation level, and also a life-cycle effect within cohorts, with disaffiliation progressing less rapidly with age for older cohorts than for newer ones. In more technical terms, the slope of disaffiliation according to age is unequal for cohorts and decreases as we go along cohorts.

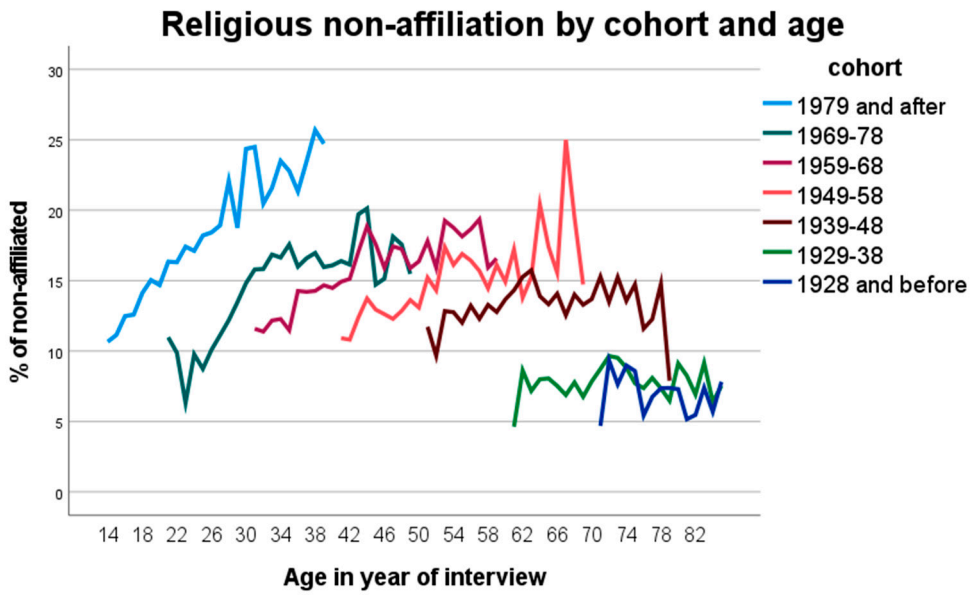

Figure 1. Proportion of religious non-affiliation by cohort and age.

3.2. Non-Affiliation—Intergroup Variance

The GEE logistic regression model for explaining religious non-affiliation, which focuses on intergroup variance, shows strong differences between cohorts (Table 2), confirming the previous graph.

Table 2. Non-affiliation—GEE logistic regression coefficients.

	Odds Ratio	***p* > *z***
age, in years	1.028	0.000
birth cohort—reference: 1979 and after		
1969–78	0.565	0.000
1959–68	0.459	0.000
1949–58	0.320	0.000
1939–48	0.205	0.000
1929–38	0.087	0.000
1928 and before	0.067	0.000
men vs. women	1.176	0.000
migration background—reference: Swiss by birth		

Table 2. *Cont.*

	Odds Ratio	$p > z$
secondos—non swiss by birth, born in CH	0.970	0.737
primos—non swiss by birth, born abroad	1.080	0.168
annual household income—reference: 1st tertile of annual HH income		
2nd tertile of annual household income—87,000–126,999 CHF	0.849	0.000
3rd tertile of annual household income—127,000 CHF and above	0.984	0.726
urban area vs. rural area	1.348	0.000
level of education—reference: primary school		
vocational training	1.118	0.040
higher education	1.591	0.000
intercept	0.077	0.000
n observations—with non missing cases on all variables	100,149	
n individuals—with non missing cases on all variables	21,124	

The odds ratios for non-affiliation decrease sharply for the oldest cohorts (e.g., OR of 0.067 for the oldest cohort, compared to the youngest, the reference group). The following graph (Figure 2) displays the evolution of the ORs of the non-affiliation of cohorts compared to the reference group. There is a general decrease, with a slope that becomes gentler as cohorts progress. It should be noted here that in order to get a complete overview, the impact of age should be added to this cohort effect, which is positive (OR of 1.028 per year of age), and which, therefore, reduces the significant differences observed between cohorts, the average age of the youngest cohort being 22.5 years, and that of the oldest 79.16.

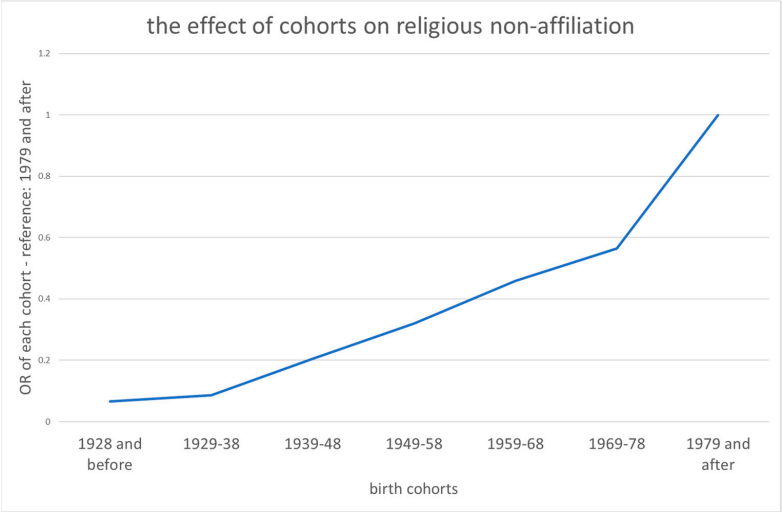

Figure 2. The effects of cohorts on non-affiliation—odds ratios.

Non-affiliation is stronger for men (OR of 1.176) compared to women, stronger in cities (1.348), and also increases with the education level (OR of 1.591 for higher education and 1.118 for vocational training, compared to those with primary school education). On

the other hand, it is less strong among middle-income earners (OR of 0.849, compared to the lowest income tier). Migration background shows no impact.

3.3. Non-Affiliation—Intragroup Variance

Within individual trajectories, the fixed effects logistic regression model or within model (Table 3) allows verifying whether there is an overall effect of age on disaffiliation, whether it is constant or not, and which sub-groups have a stronger or weaker effect, taking into account the interaction effects with age. It should be remembered that this model does not, by definition, make it possible to study the difference in levels between groups, as the impact of invariant variables cannot be measured, and only the cases of individuals whose religious non-affiliation varied were kept for the analyses.

Table 3. Non-affiliation—fixed effects logistic regression coefficients.

	Odds Ratio	***p* > *z***
age, in years	1.217	0.000
birth cohort x age—reference: 1979 and after		
1969–78	0.965	0.033
1959–68	0.922	0.000
1949–58	0.899	0.000
1939–48	0.882	0.000
1929–38	0.871	0.000
1928 and before	0.897	0.096
men x age—reference: women	0.982	0.053
migration background x age—reference: Swiss by birth		
secondos—non swiss by birth, born in CH x age	0.921	0.000
primos—non swiss by birth, born abroad x age	0.944	0.000
annual household income x age—reference: 1st tertile of HH income		
2nd tertile of annual household income—87,000–126,999 CHF x age	1.025	0.036
3rd tertile of annual household income—127,000 CHF and above x age	1.023	0.064
urban area x age—reference: rural area	0.996	0.656
level of education x age—reference: primary school		
vocational training x age	1.013	0.458
higher education x age	0.981	0.264
n observations—with non-missing cases on all variables	100,149	
n individuals—with non-missing cases on all variables	21,124	
of which n observation—with variance on the dependent variable	14,545	
of which n individuals—with variance on the dependent variable	2002	

In general, disaffiliation increases with age (odds ratio of 1.217 per additional year of age), but it increases less rapidly with age for older cohorts, as shown by the interaction effects of age with cohort (OR of 0.965 for the 1969–1978 cohort, OR of 0.897 for people born in 1928 and earlier, etc., compared to the reference group born in 1979 or later, with most being significant). However, the pattern of having more disaffiliated people at the end of each cohort (except 1928 and before) points to a period effect.

Below is a graphical representation of the odds ratios of disaffiliation for each additional year of age, according to cohorts (Figure 3). The final ORs of the figures are obtained by multiplying the main effect of age by the interaction effect of each cohort with age (OR of 1.217 for the youngest cohort, i.e., the reference group, OR of 1.217 × 0.965 for the 1969–1978 cohort, etc.). As seen graphically, disaffiliation increases less rapidly with age for the older cohorts than for the younger ones. The slope gradually drops, rising very slightly for the oldest cohort (although, we note that the interaction effect is not significant for this cohort, with $p = 0.096$, due to the smaller number of cases).

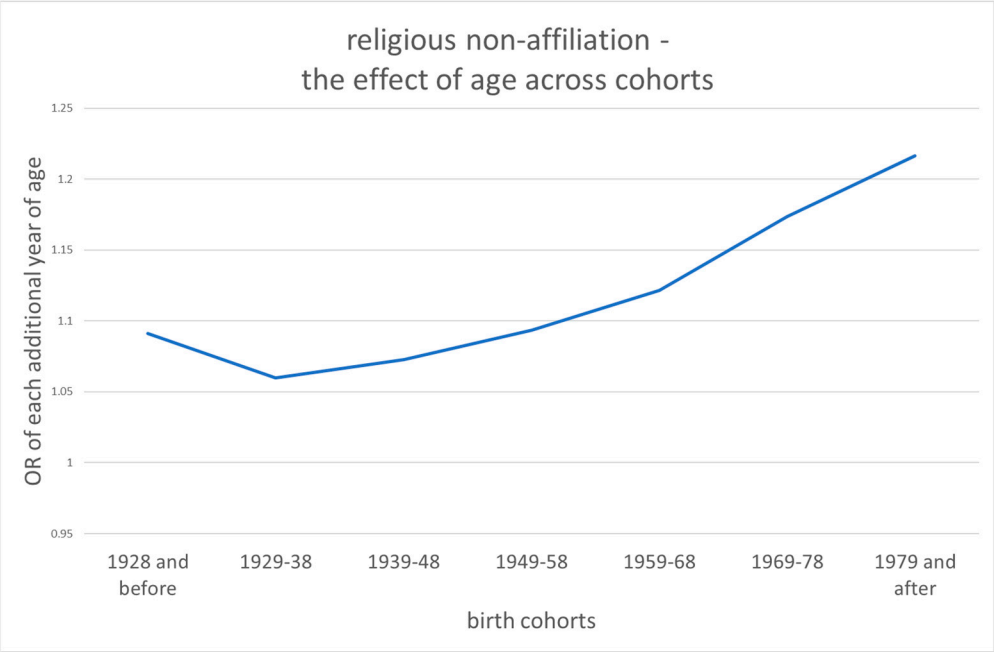

Figure 3. The effects of age across cohorts on non-affiliation—odds ratios.

Disaffiliation increases with age for men and women in rather similar ways (the interaction effect of gender and age is not significant, with $p > 0.05$), and increases less rapidly with age for second- and first-generation immigrants (OR of 0.921 and 0.944, respectively, which must be multiplied by the main effect of age to obtain the overall effect of each year for each of these sub-groups) compared to the "Swiss of origin". It evolves in a similar way in urban and rural contexts and for all education levels ($p > 0.05$), and slightly faster for middle incomes (OR of 1.025, at the limit of significance, with $p = 0.036$, for the interaction with age compared to the lowest income tertile.

3.4. Religious Attendance and Personal Prayer

Figures 4 and 5 show, graphically, the evolution of religious service attendance and personal prayer among Protestants and Roman Catholics, on a monthly frequency. They highlight the same double effect shown earlier.

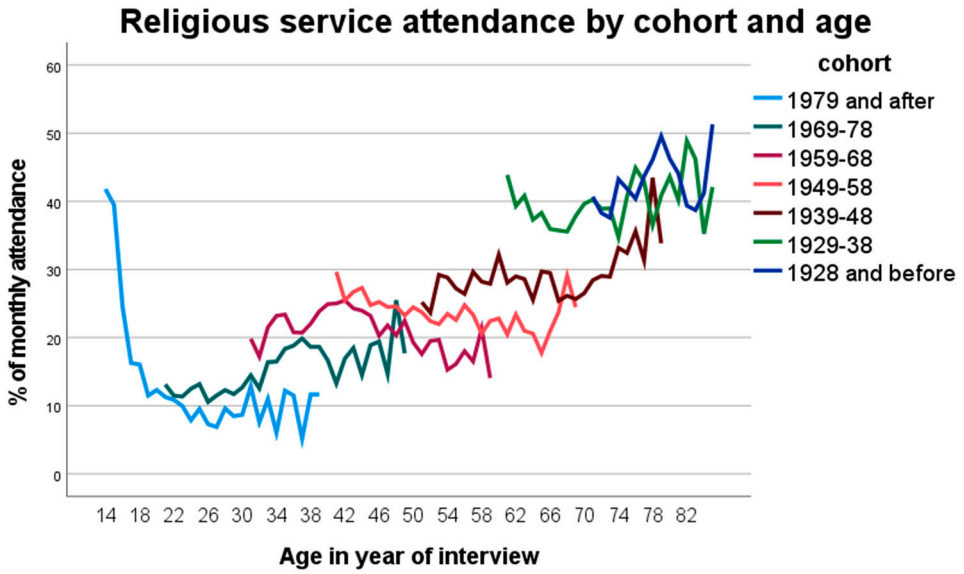

Figure 4. Proportion of participants in religious services by cohort and age.

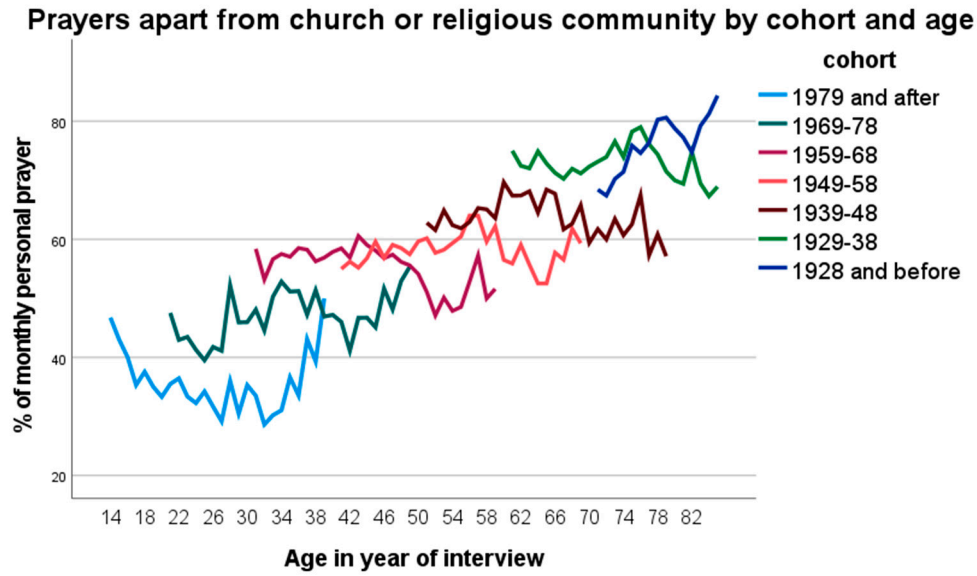

Figure 5. Proportion of prayers apart from church or religious community by cohort and age.

Firstly, there is a cohort effect, with the youngest cohorts tending to practice less and pray less.

Secondly, there is also a differentiated evolution within cohorts, i.e., a rapid distancing for the youngest cohort, and this is even more marked for practice, and then a different evolution according to age for each cohort, which seems to indicate a varying life-cycle effect.

3.5. Practice and Prayer—Intergroup Variance

The GEE logistic regression model, explaining religious attendance and prayer among Protestants and Catholics (Table 4), shows strong differences between cohorts for both religious service attendance and prayer, confirming the previous graph.

Table 4. Religious attendance and personal prayer—GEE logistic regression coefficients.

	Religious Attendance (Monthly)		**Personal Prayer (Monthly)**	
	Odds Ratio	***p* > *z***	**Odds Ratio**	***p* > *z***
age, in years	0.978	0.000	0.987	0.000
birth cohort—reference: 1979 and after				
1969–78	1.043	0.588	1.963	0.000
1959–68	1.950	0.000	2.995	0.000
1949–58	3.003	0.000	4.172	0.000
1939–48	5.125	0.000	6.351	0.000
1929–38	11.362	0.000	11.068	0.000
1928 and before	14.903	0.000	14.065	0.000
men vs. women	0.837	0.000	0.472	0.000
Protestant vs. Roman Catholic	0.402	0.000	0.536	0.000
migration background—reference: Swiss by birth				
secondos—non swiss by birth, born in CH	0.788	0.060	0.893	0.256
primos—non swiss by birth, born abroad	1.102	0.182	0.991	0.894
annual household income—reference: 1st tertile of annual HH income				
2nd tertile of annual household income—87,000–126,999 CHF	0.967	0.491	0.933	0.094
3rd tertile of annual household income—127,000 CHF and above	0.870	0.009	0.873	0.002
urban area vs. rural area	0.667	0.000	0.797	0.000
level of education—reference: primary school				
vocational training	0.719	0.000	0.952	0.289
higher education	0.825	0.001	0.998	0.968
intercept	0.873	0.052	1.654	0.000
n observations—with non missing cases on all variables	58,931		58,263	
n individuals—with non missing cases on all variables	13,031		12,988	

Religious service attendance increases strongly in the oldest cohorts (OR of 14.903 for the 1928 cohort and before, compared to the reference group, those born in 1979 or

later). Religious attendance is weaker for men and for Protestants (OR of 0.837, compared to women, and 0.402, compared to Catholics), slightly weaker for second-generation immigrants (OR of 0.788, compared to Swiss of origin, but with $p = 0.06$), weaker for high incomes (OR of 0.870, compared to the first income tertile), weaker in cities (OR of 0.667), and weaker for people with a professional or higher education (0.719 and 0.825, respectively, compared to those with a basic level).

Personal prayer also increases very strongly in the oldest cohorts (OR of 14.065 for those born in 1928 and before, compared to those born in 1979 or later), and this varies in a gradual way. Prayer is also less frequent for men and for Protestants (OR of 0.472, compared to women, and 0.536, compared to Catholics), weaker for high incomes (OR of 0.873, compared to the first income tertile), weaker in cities (OR of 0.797). Migratory background and education level do not show any differences.

The following figure (Figure 6) graphically shows the cohorts' strong effect on both indicators, with a similar overall trend. Again, these differences are very impressive and statistically significant.

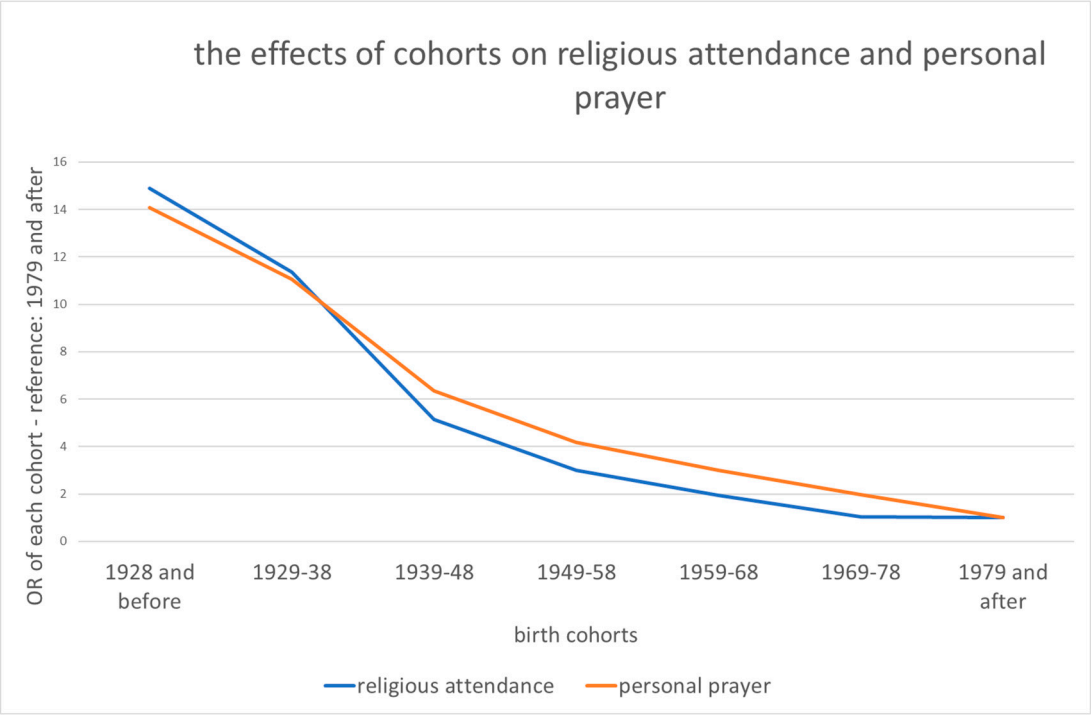

Figure 6. The effects of cohorts on religious attendance and personal prayer—odds ratios.

3.6. Practice and Prayer—Intragroup Variance

Within individual trajectories, fixed effects logistic regression models allow us to check whether there is an overall effect of age on religious attendance and prayer, whether this is constant or not, and in which subgroups this effect is, respectively, more or less strong (Table 5).

Table 5. Religious attendance and personal prayer—fixed effects logistic regression coefficients.

	Religious Attendance (Monthly)		Personal Prayer (Monthly)	
	Odds Ratio	***p* > z**	**Odds Ratio**	***p* > z**
age, in years	0.675	0.000	0.898	0.000
birth cohort x age—reference: 1979 and after				
1969–78	1.441	0.000	1.114	0.000
1959–68	1.364	0.000	1.091	0.000
1949–58	1.339	0.000	1.121	0.000
1939–48	1.414	0.000	1.106	0.000
1929–38	1.418	0.000	1.128	0.000
1928 and before	1.319	0.000	1.179	0.000
men x age—reference: women	1.024	0.009	0.996	0.600
Protestant x age—reference: Catholic Roman	1.049	0.000	0.986	0.055
migration background x age—reference: Swiss by birth				
secondos—non swiss by birth, born in CH x age	1.000	0.994	1.017	0.456
primos—non swiss by birth, born abroad x age	0.991	0.595	0.979	0.135
annual household income x age—reference: 1st tertile of HH income				
2nd tertile of annual household income—87,000–126,999 CHF x age	0.984	0.135	1.003	0.769
3rd tertile of annual household income—127,000 CHF and above x age	0.953	0.000	0.982	0.071
urban area x age—reference: rural area	0.991	0.307	1.009	0.240
level of education x age—reference: primary school				
vocational training x age	1.022	0.104	0.987	0.280
higher education x age	1.035	0.027	0.980	0.141
n observations—with non missing cases on all variables	58,931		58,263	
n individuals—with non missing cases on all variables	13,031		12,988	
of which n observation—with variance on the dependent variable	17,570		22,517	
of which n individuals—with variance on the dependent variable	2355		3211	

Each supplementary year of age reduces practice (OR of 0.675 per year of age) and prayer (OR of 0.898 per year) for the reference cohort (1979 or later). This decrease is different for the other cohorts, as shown by the interaction effects of successive cohorts with age.

In order to have the total impact of each year of age on religious service attendance and prayer, respectively, for the other cohorts, the generic effect of age must be multiplied by the interaction effect specific to each cohort, in relation to the reference group—people born in 1979 or later. For example, for people born between 1969 and 1978, the final ORs are 0.973 (0.675 × 1.441) for practice and 1.000 (0.898 × 1.114) for prayer for each additional year of age.

Below is a graphical representation of the odds ratios for practice and prayer for each additional year of age, according to cohort (Figure 7). As can be seen graphically, prayer

and, especially, practice decrease very rapidly for the youngest cohort. The evolution is then slightly different for practice and prayer.

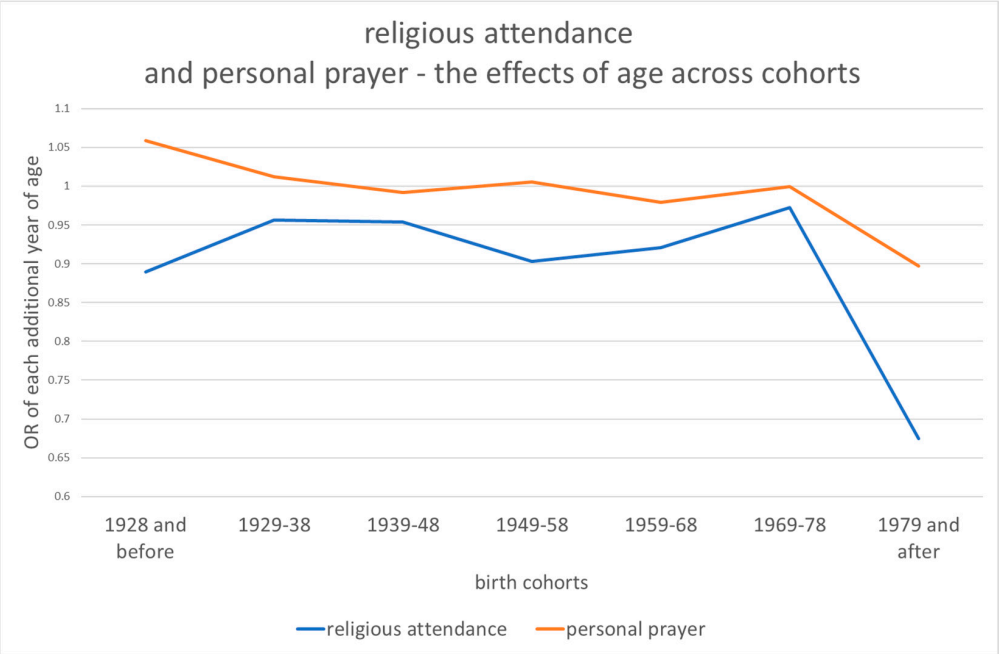

Figure 7. The effects of age across cohorts on religious attendance and personal prayer—odds ratios.

For prayer, ORs then rise to almost parity for the next cohort (1969–1978), then oscillate around parity, then increase above 1 for the last two cohorts (1929–1938; 1928 and before). Although prayer decreases very rapidly over time among the young, it then stabilizes, increasing slightly during the last years of life. The general trend is a fairly steady increase from one cohort to the next.

Religious attendance seems to be more dependent on the different stages of the life cycle. After a sharp fall among the youngest cohort (1979 or later), we see an increase among the next cohort (1969–1978), which can be linked to religious services related to the stages of family construction and life (marriage, baptism, children's religious education, confirmation, etc.). Religious attendance then tends to fall for the next two cohorts of 10 years (1959–1968, then 1949–1958), before rising again and reaching a plateau for the next two cohorts (1939–1948 and 1929–1938), again in relation to the stages of family life (children's marriages, baptism, grandchildren's confirmation, etc.). Religious service attendance then declines year by year among the last cohort (1929 and before), possibly due to health problems, mobility, and the gradual loss of social relations.

Religious attendance decreases less for men (OR of 1.024 for the interaction with age) than for women, and for Protestants (OR of 1.049 for the interaction with age) than for Catholics. It decreases slightly faster for the better-off (OR 0.953 for the interaction between the third income tier and age) and slightly more slowly for people with higher education (OR 1.035 for the interaction with age). Religious attendance does not change over time with migration status or urban/rural areas.

As regards prayer, the age effect is the same for men and women ($p > 0.05$ for the interaction with gender). It differs neither between Protestants and Catholics nor according to migratory background, level of education, or urban/rural context ($p > 0.05$ for each of the interactions with age).

Combined with the previous analysis, we deduce that religious attendance by men and Protestants is generally lower than that of women and Catholics, and that it also tends to decrease slightly less over time in these same sub-groups. The wealthiest people practice less, but their practice also decreases faster with age than other income groups.

Concerning prayer, we notice that men and Protestants pray, in general, less but experience a similar decrease in prayer during their lifetimes to that of women and Catholics.

4. Discussion

Reading these results, a first general observation can be drawn: for the three religious indicators, a cohort effect is a central element in explaining the decline in religiosity. Each birth cohort is less religious on all three indicators, that is, younger individuals are less affiliated, practice less often, and pray less than the older cohort. This strong trend noted on the basis of other cross-sectional surveys must, however, be qualified by the longitudinal data analyzed here. More subtly, we also see an effect of age or life cycle, especially on the practice indicator, and a period effect on the religious individuals' disaffiliation. The cohort effect observed in the individual analyses made it possible to highlight certain religious stability for each cohort, but this is not what we observed through the SHP data. Each birth cohort shows a more religious profile of individuals at the start of the cohort than at the end. There is, therefore, an initial distancing movement from religion by birth cohorts, but this is further accentuated by a period effect for disaffiliation and sometimes accelerated and, at other times, slightly contained by a life-cycle effect.

Let us note one of the SHP data-specific features: it includes individuals between 14 and 18 years of age. Data from individuals of this age allow us to have a cohort from adolescence to early adulthood. This cohort has the particularity of showing a dramatic religious change between the beginning, around the age of 14, and the situation at the end of the cohort, around the age of 34.

For religious service attendance, we observed that the religious education given by churches makes it possible to have a relatively high rate of practice. However, as soon as the confirmation is performed (between 14 and 16 years old), practice frequency drops dramatically and stabilizes in adulthood, around 25 years of age. However, individuals in this cohort continue to distance themselves from religion by becoming disaffiliated following an upward slope throughout the birth cohort. Personal prayer follows this same trend less remarkably. This birth cohort allows us to note that churches that have access to youth education can maintain some practice into early adolescence. However, this religious socialization, which still allows 40% of 14-year-olds to regularly practice a religion, does not make churches capable of keeping this population. As soon as the religious education cycles are completed, young people first turn away from religious attendance and then follow a trend of estrangement by abandoning their religious affiliation later in life. This cohort, therefore, behaves, in terms of practice, in a very specific way. A simple explanation for this phenomenon can be put forward: the church in Switzerland can still offer religious education, and some parents set great store by this instruction. Teens, thus, practice more regularly than the general population. Once this instruction stage is over, we observed that this cohort's practice collapses. These data allow us to shed new light on the cohort effect. From individual surveys, we observed relative stability within each birth cohort, but we observed with a longitudinal survey that this is not quite the case. The young cohorts post a significant difference between the youngest and the oldest in the same cohort. They drop out faster than older cohorts than themselves, which further reinforces society's secularization.

The second effect the longitudinal data shows is that of the period effect on disaffiliation. A period effect because all the cohorts are affected by individuals who disaffiliate continuously in each of the birth cohorts. An effect that weakens, of course, with the oldest, but which affects all individuals until retirement age. This trend clearly shows that, in addition to the strong cohort effect, there is a second effect, a period effect, which further accelerates individuals' distancing from their religious affiliation.

Here is the third effect concerning religious attendance: it is related to the life cycle, which speeds up or slows down the observed distancing general effect. We have already discussed the significant dropout of young people at the end of their religious education. We then notice a small increase in practice in the years when individuals are building their

families, then when they become grandparents, and then a drop again, with the aging difficulties. The high practice rate noted for 14-year-olds results in maintaining a certain level of practice for parents and grandparents.

These data clarify Stolz and Senn (2022)'s results in Switzerland. They suspected an age effect. There is, indeed, a life-cycle effect for religious attendance, but this has a dramatic impact on cohorts entering adulthood. It was possible to analyze this with the specificity of our data integrating teens from 14 years old, generally absent from individual studies. Moreover, the period effect, which further accelerates the decrease in cohorts' religiosity, was not discussed in previous papers on secularization by birth cohorts.

This analysis also allowed us to integrate socio-demographic elements. These elements, such as gender, level of education, income, type of place of residence, etc., do not counterbalance the cohort effect, which remains the strongest element of such distancing from religion. A question remains open as to the migratory background impact. We found, unsurprisingly, that the first and second generations disaffiliated less than the Swiss with age. More surprising is the observation that second generations' practice is slightly weaker than that of the Swiss. This may be due to the fact that our observations come only from members of the majority Christian religions. As Molteni and van Tubergen (2022) point out, the decline in the religiosity of the second generation is identical to the host country populations, when they belong to the same majority religious group as in our study. According to these authors, people need to be, among others, members of a minority religion to show resistance to religious decline. This question merits further investigation.

In a similar way to what we know on this topic from repeated cross-sectional surveys rather than panel studies, cohort effects usually dominate, though a period effect was detected, notably for New Zealand (see Voas and Chaves 2016).

The nature of cohort-based decline is that there is a downwards shift in religiosity from one generation to the next. When does that happen? The analysis shows that religious socialization occurs, but it is often not very effective: a large part of teenagers and young adults drift away. Adolescence and early adulthood is clearly a transitional stage, also for religiosity. Previous studies have argued that an age effect occurs in the 14–29 age interval, without really knowing the extent of the trend. Our study shows, for the first time, the extent of this effect for young adults. A strong and significant effect that fades considerably in the following course of life. The key question is to know when this effect is no longer significant. Our study seems to point to a changeover around the age of 25.

5. Conclusions

To show the decline in religiosity, many surveys show how younger birth cohorts are less religious than earlier ones. These are mainly based on cross-sectional data from individual quantitative surveys. These surveys show a clear cohort effect, but little can be said about life-cycle or period effects. In this article, we have based ourselves on longitudinal panel data from the SHP, collected from 1999 to 2018. We are, thus, able to note that the cohort effect is the most important to explain the process of moving away from religion. However, this effect is further accelerated by a period effect for affiliation since, in each cohort, the number of affiliated individuals decreases. This study implements a broader understanding rather than modifies the cohort change effect discussed previously.

One of the most striking findings of this paper is to be able to show the significance of the age effect on younger birth cohorts, especially for the practice frequency. A strong and significant age effect was identified for the 14–29 cohort, which fades in the next birth cohorts. It seems that a changeover in this age effect occurs around the age of 25. For practice frequency, there is an early and massive collapse of practice between the ages of 14 and 29. A small rebound in practice can be observed when individuals start a family and when they become grandparents and then it drops again with old age.

For its part, personal prayer follows a cohort effect structure. Socio-demographic indicators secondarily speed up or slow down the process, but cannot explain religious changes, such as cohort, age, or period effects. Further analyses are now needed to

differentiate between individuals who increase their practice over their lifetime within a cohort and those who decrease it in order to better understand these age-cycle effects. Another question is where the boundary of the observed age effect for the younger birth cohorts lies: early 20s? mid-20s? late 20s? or even later?

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Notes

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[2] The two variables measuring religious attendance and prayer are originally more detailed but cannot, in any case, be considered as continuous. In view of the difficulty of graphical and numerical representation of the statistical processing of such data, for which groupings would, in any case, have had to be found, we opted for monthly dichotomies, which correspond to the usual practice for such indicators.

[3] Although the questions are asked to everyone by the SHP, we opted to study practice and prayer only among people affiliated with the two dominant religions in Switzerland in order to provide a valid basis for comparison with the situation in other contexts, as reported in the literature.

[4] This second part of these analyses, therefore, excludes those declaring a religion other than the main ones mentioned above (10.1% of the total) and the non-affiliated (14.2%), as well as those whose affiliation varies over time, even if only once, during their follow-up by the panel.

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