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## Abstract

We use longitudinal data on fertility and religious affiliation in Finland to examine average number of children and parity. All analyses are based on detailed information from the Finnish national register of each person's religious denomination for men and women born between 1956-1975. We identify higher fertility among members of the Evangelical Lutheran state church and other Protestant churches, and lower fertility among individuals with no religious affiliation. Most other religious groups—Orthodox Christians, Jews, Muslims, and adherents of Eastern religions—have intermediate levels of fertility. We also find that religious converts typically show a pattern similar to that of co-religious non-converts of the group they convert to, though with even more distinct deviations from the average patterns. Women show larger differences by religious affiliation than men. Fertility differences by religion are particularly pronounced for childlessness. Overall, differences between religious groups are rather modest, and childbearing patterns are quite similar. Our results provide, to our knowledge, the first examination of religion and fertility using national-level longitudinal data.

**Keywords:** religion, fertility, Finland, secularization, homogamy, conversion, demography

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## Introduction

Religion is a central dimension for many explanations of demographic change. It has been an important issue in theories of family change in high-income countries since the 1960s, as increasing individualization and secularization have been linked to lower fertility (Lesthaeghe 1995; Thornton 2005). A decline in organized religion and religious worldviews has been seen as a part of the general modernization process.

Many demographic studies of religion have been concerned with secularization, the intensity of religious beliefs, and how they affect childbearing preferences and outcomes (Frejka and Westoff 2008; McQuillan 2004; Mosher, Williams and Johnson 1992). In this study, we take a different perspective from much previous research that has linked fertility to religiosity and religious practices. We focus instead on differences in childbearing across denominations and religious groups. In some contexts, such as the US, there exists much research on differences in fertility among different Christian denominations, with a particular focus on differences between mainline Protestant denominations, Catholics, Evangelical Protestants, and the unaffiliated (Frejka and Westoff 2008; Hackett 2008). A smaller literature has attempted to study this question from a global perspective, sometimes using data on religion and fertility to estimate the future population compositions of religious groups (Hackett et al. 2015). Fertility differences by religion are together with patterns of religious change, the primary determinants of the future composition of the religious landscape in the world (Stonawski et al. 2015).

We expand on this topic by examining differences by religious denomination in the highly secular Nordic context, for which there is comparatively little previous research on the interrelation between religion and fertility. We do this by applying unique data from Finland, which maintains unique longitudinal population registers of not only demographic variables but also each person's religious denomination. This allows us to also study differences by minority religious affiliation, even though Finland was, in terms of religion, a rather homogenous country during our study period.

By using administrative register data instead of surveys, we make several contributions to the study of religion and fertility. First, we use national-level population data with highly accurate measurements of both fertility and religion, studying Finnish men and women born between 1956 and 1975, who have been resident in Finland after age 15. This allows us to study quite small denominations and aspects such as parity differences. We also do this by sex, examining patterns separately for men and women, thus taking advantage of the availability of reliable fertility data for men as well. Second, we use high-quality longitudinal register data

with yearly information on membership by religious denomination. This allows us to study fertility differences between converts and non-converts. Studying the fertility of converts by denomination has to our knowledge very seldom been done in research on religion and fertility. Third, we also incorporate partners' religions, distinguishing how the interaction between one's own and one's partner's religion affects fertility.

### *Previous research on religion and fertility*

For over a century, a large body of research has examined the link between religion and fertility. In prominent explanations of the demographic transition—and the associated transformative fall in fertility—cultural change, intrinsically linked to secularization, has been highlighted as of fundamental importance for falling fertility (Lesthaeghe (1983. Already in Notestein's (1945) formulation of the demographic transition theory, the weakening of religious doctrines was an important explanation for fertility decline, as it was argued that religion had previously maintained fertility at a high level.

In light of religion's importance as a mechanism behind fertility, much empirical work has linked the two concepts. A common finding is that the intensity of religious beliefs and practices is a strong positive determinant of fertility (Berghammer 2012; Frejka and Westoff 2008; Hackett 2008; Mosher et al. 1992; Zhang 2008). It has also been argued that religious practices are more important than beliefs and affiliation (Philipov and Berghammer 2007). Some research also suggests that differences in fertility across religious groups have decreased in importance over time, but the salience of individual religiosity within groups has remained an important determinant (Kaufmann 2010; Zhang 2008). While the highest fertility is found among the most religious, the lowest fertility is often found among the non-affiliated—indeed, explicitly atheistic individuals have the lowest fertility (Frejka and Westoff 2008; Hackett 2008). The importance of non-affiliation is particularly relevant in the Finnish context, as the two largest religious groups consist of members of the Finnish state church and those who have actively decided to leave the state church and are unaffiliated.

As our study is focused on differences by religious denomination, we will begin by discussing previous research documenting trends in average fertility across religious denominations, with less attention to the larger literature focusing on religiosity and fertility. US studies have documented higher fertility among Evangelical Protestants and black Protestant churches (Hackett 2008), a difference also found elsewhere (Dilmaghani 2019; McKinnon, Potter and Garrard-Burnett 2008). Mainline Protestant churches have lower fertility than the population average, with Catholics in between. Recent studies suggest that, while for

most of the second half of the 20th century, fertility was very high among Evangelical Christians, these groups have also started to see substantial fertility declines since the 1990s (Perry and Schleifer 2019).

Little is known about fertility among members of what, in a Nordic context, are known as “free churches” (Protestant churches outside the state church), which are associated with Christian revivals during the 19<sup>th</sup> and early 20<sup>th</sup> centuries and, later, congregations inspired by American charismatic Christianity (Iversen 2006). These groups amount to a substantial share of committed and practicing Christians in the Nordic context (Iversen 2006). An exception is the Laestadians, who are committed and practicing Christians with high fertility but belong to the Evangelical Lutheran state church (Finnäs 1991).

When we focus on differences across denominations, we note that different Protestant denominations—both in the US and Nordic contexts—are largely distinguished by the intensity of the religiosity of their adherents (Hackett 2008). Membership is also therefore often substantially self-sorted based on the religious preferences of the members. Thus, the strength of religiosity is likely an important determinant distinguishing different Protestant denominations.

High fertility among Catholics has been central in much historical traditional theorizing on religion and demographic change in both the US and Europe. Recent studies find that Catholics have lower fertility than Protestants in many European countries, with small differences in the US (Frejka and Westoff 2008; Mosher et al. 1992). This is in contrast to historic patterns, though is still not a universal pattern, where Catholics still have higher fertility in for example the UK (Peri-Rotem 2016). These trends also mirror patterns at the cross-national level, where Catholic European countries used to have high fertility and are now instead among the lowest low-fertility countries (Berman, Iannaccone and Ragusa 2018). In some European contexts such as Spain, researchers find quite small differences by religion (Mogi, Esteve and Skirbekk 2022).

A consistent finding across most contexts is lower fertility among the non-religiously affiliated (Frejka and Westoff 2008; Hackett et al. 2015). It seems that most aspects of non-religiosity, such as non-attendance, lack of beliefs, non-affiliation, and expressed atheism, are in most contexts linked to lower fertility (Frejka and Westoff 2008; Hackett 2008).

Jewish fertility is consistently low in the US and also, most likely, in western Europe (Hackett 2008; Mott and Abma 1992), though this is in contrast to the high-income context of Israel, where fertility remains at a relatively high level, particularly among more religious Jews but also among secular ones. Historically, Jews in eastern Europe have had relatively high

fertility, though fertility among Jews living in western Europe was (Livi-Bacci 1986), and may still be, lower than that of the majority population. Muslim fertility in Europe is often described as high, though less is known about patterns in the Nordic countries, and it seems that many recent immigrant groups from Muslim countries have fertility levels that are a bit higher in the first generation (Stonawski, Potančoková and Skirbekk 2016; Westoff and Frejka 2007) and comparable or lower in the second generation compared to the majority population (Andersson, Persson and Obucina 2017). In western and central Europe, Muslims more consistently have higher fertility than the majority population, though the increase is rather moderate (Westoff and Frejka 2007). In southeastern Europe, where Islam has a long history, fertility is higher among Muslims than other groups (Stonawski et al. 2016; Westoff and Frejka 2007).

Orthodox fertility in the US is below the population average (Hackett 2008), while little is known about Orthodox fertility in Europe, though immigrant groups from Orthodox European countries that live in central and western Europe often show the same low fertility observed in their countries of origin (Andersson et al. 2017). Less is known about smaller and rapidly growing Christian religious affiliations in Europe, such as the Church of Latter Day Saints (hereafter Mormons) and Jehovah's Witnesses, though in the US, high fertility among Mormons is well documented (Hackett 2008). Little is known about fertility among the Jehovah's Witnesses, but some evidence suggests it is higher than the population average (Stark and Iannaccone 1997). In contrast to the Abrahamic religions, there is little evidence that Buddhism is positively related to fertility (Skirbekk et al. 2015). Not much is known about the link between religiosity and other East Asian religions, particularly in a European context. Overall, research on religion and fertility in Europe has often been limited by small data materials, where researchers have only had access to surveys which have made it hard to study minority religious groups.

In contrast to the US and continental Europe, there has been very little research on the link between childbearing and religion in the Nordic countries. One exception is a study by Finnäs (1991) of the high fertility of the Laestadians in a local Finnish setting. Researchers in the Nordic countries have otherwise examined the fertility transition in the 19th and early 20th centuries and (implicitly) related it, in different ways, to religiosity (Junkka and Edvinsson 2016; Larsson 1984; Sundt 1857[1993]). Carlsson (2022) examined fertility in Sweden using survey data and found higher fertility among native free church members and slightly lower fertility among the non-affiliated than affiliates of the state church. Among migrants, he found strongly elevated fertility among both Muslims and Christians relative to non-religious individuals.

With few exceptions, nearly all the findings we report above refer to female fertility and female religiosity, while we know substantially less about male fertility behavior, and particularly its interrelation with religion. We note that there are debates on the gendered nature of religiosity and spirituality, and on how they differ across religions. Broadly speaking, Christian religions are often characterized by more female adherents and stronger religiosity among women, while for some other religions, such as Islam, religiosity is, at least publicly, more important for men (Francis and Penny 2013). Most previous research on religion and fertility has focused on women and little has focused on fertility by intermarriage, which we examine in this study. With very few exceptions, nearly all of the studies examined above have been limited in their data material, to not be able to either study converts/non-converts or how homogamy in partner religion affects childbearing by denomination.

Our study, which is broad and descriptive in nature, means that our results will reflect many compositional and selection aspects of the minority religions we analyze. In many cases, the contexts and group compositions likely differ substantially from contexts where the religious group is a majority denomination in the society. To examine these issues, we will control for socioeconomic conditions in our study population. They reflect differences in observable characteristics and not the social and cultural context of belonging to a religion, which is an important feature in many other parts of the world. In our study population, individuals from religions of non-European/Abrahamic origin are born in Finland and thus not necessarily representative of the more recently arrived large immigrant populations in the rest of Europe. However, this does not affect the internal validity of our study, and apart from issues related to the external validity of extrapolating our findings to other countries, it is worth stressing that this study serves as the first examination of religious denomination based on full population register data, and in particular, how it relates to female and male fertility and intermarriage. It is also of key importance that our research design emphasizes a life course perspective.

### *Demography and religion in Finland*

The Nordic region is often considered a “forerunner” of many family demographic trends, such as the increase in cohabitation and divorce and the decreases and delays in marriage and marital childbearing (Lesthaeghe 2010). Finland, like its Nordic neighbors, has often been used to exemplify countries in the vanguard of the so-called second demographic transition, where falling fertility is linked to secularization (Lesthaeghe 2010; Van de Kaa 1987). Lately,

Finland, like several other Nordic countries, has experienced a relatively rapid fertility decline (Comolli et al. 2021).

Finland has, also like the other Nordic countries, undergone rapid secularization and become among the most secular nations in Europe (Voas and Doebler 2011). The country has two national churches that are similar to the state churches in the other Nordic countries. The two main churches are the Evangelical Lutheran church of Finland (around 2/3 of the population) and the orthodox church of Finland (1%). Due to the unique overlap between the state church and government and the historical role of the church in population administration, Finland has collected data on religious denominations for a long period, and government registration, where individuals are registered as part of a religious denomination (including no denomination), is regulated by law. Unlike in other Nordic countries, these data also include smaller denominations in a comprehensive way.

While church membership is still high in Finland, religious practice among most members of the state church is low, and for many, the church fulfills more of a cultural than spiritual role in people's lives (Iversen 2006). To interpret patterns within this large group, it is thus useful to relate this population to the large groups of "nominally" affiliated individuals in other European countries (Peri-Rotem 2016). Within this group, there are practicing members who regularly attend church, but they remain a minority of all state church members. In 2020, 30% of the population in Finland had no religious affiliation, a share that increased steadily over our study period (Xia, Kolk and Saarela 2022).

Unlike in the other Nordic countries, much of the activity during the religious revivals of the 19<sup>th</sup> and early 20<sup>th</sup> centuries was, in Finland, integrated into the Evangelical Lutheran state church (Iversen 2006). Many, but not all, of these congregations are therefore formally integrated into the national church, and at a higher rate than in the other Nordic countries. The Laestadians are one example (Finnäs 1991), and they are, in our study, consequently counted as members of the state church. Under Russian rule, a small community of Tartars settled in Finland, organizing their own mosques and remaining distinct from more recent Muslims arriving in Finland. Finland has also had a relatively small but well-integrated and deeply rooted Jewish community since the 19th century. The minority native Sami population in northern Finland has, and to some extent continues to practice a religion based on Shamanism and Animism, but this is not organized into a religious structure/organization which is categorized by the government (and is thus not reflected in our data). Over time many Sami have become members of the State Church and the Laestadian community.



Finland is a bilingual state with a minority of Swedish speakers and a majority of Finnish speakers, and there are more non-affiliated individuals in the Finnish-speaking majority population (Xia et al. 2022). Protestant churches that are not part of the state church have an overrepresentation of Swedish speakers, and the Jewish community in Finland is majority Swedish-speaking.

## **Data and methods**

Our data are based on total population counts of all individuals who lived in Finland at any point between 1970 and 2020. Through parent–child linkages, we could create accurate childbearing histories for both men and women. Linkages were accessible due to unique personal identity numbers, and they allow seamless and accurate matching. Uniquely in the world, Finnish population registers keep track of religious data, including for members of non-state church denominations. This information, which was collected for every individual and every year from 1971–2020, is integrated into the longitudinal population register and updated on a yearly basis.

Our raw data contain information on about 50 different denominations, which we aggregated into nine groups: (1) the Evangelical Lutheran state church, (2) no religion (without any affiliation), (3) Orthodox (the Orthodox state church plus Orthodox denominations that are not part of it), (4) other Protestants (various Protestant churches independent of the state church), (5) other Christians (denominations such as Jehovah’s Witnesses and the Latter Day Saints church), (6) Catholicism, (7) Islam, (8) Eastern (various denominations, such as Buddhists, Bahai, and Hindus), and (9) Judaism. We ordered them in our data by relative size. For our summary table, we additionally break down the (3) Orthodox, (4) other Protestant, and (5) other Christian groups into smaller denominations within these larger groupings, while all other results are based on the grouping above.

For our main analyses, we restricted the data to persons born from 1956–1975. We could thereby observe each individual’s complete childbearing history up to age 45 and religious domination at ages 15 (before childbearing starts) and 45. To ensure that records on childbearing were complete, we further restricted the study population to individuals who had consistently lived in Finland from ages 15–45. Those who emigrated and/or return migrated between ages 15 and 45 were thus excluded, as were those who died before age 45. Our study population consisted of 629,038 women and 650,044 men.

As we studied the population born before 1976 that never migrated after age 15, and conditional on residence in Finland at age 15, individuals with an international migration history

were therefore mostly excluded from our analysis. Immigration to Finland was very modest before the 1990s. The number of members in some religious denominations according to our classification—Catholic, Muslim, Eastern, and Jewish—are therefore small, and contain only a few hundred individuals. We thus performed parallel analyses with the same criteria described above but which also included the cohorts born from 1938–1955. This study population was, therefore, approximately twice as large. These additional results are broadly similar to the others reported here and are available upon request. For these older cohorts, fertility is nevertheless somewhat undercounted because parent–child linkages in 1970 were conditional on co-residence and not on birth records, and religious denomination cannot be observed at age 15 before 1955.

In the results section, we present the mean number of children by religion at age 45 for women and men born from 1956–1975. For each sex, we calculated the contribution by parity and displayed eventual childlessness by religious affiliation. We compared persons who converted to each religious denomination to those who did not convert and calculated both the average fertility of each indexed individual and their first childbearing partner’s religious denomination. Poisson regressions were estimated to evaluate whether socioeconomic and demographic variables affected fertility differences by religion. We report average marginal effects based on the Poisson regressions, which can be straightforwardly interpreted as differences in the mean number of children and easily compared to our descriptive results. We attach all our aggregated data used to make our figures in supplemental file S1.

## Results

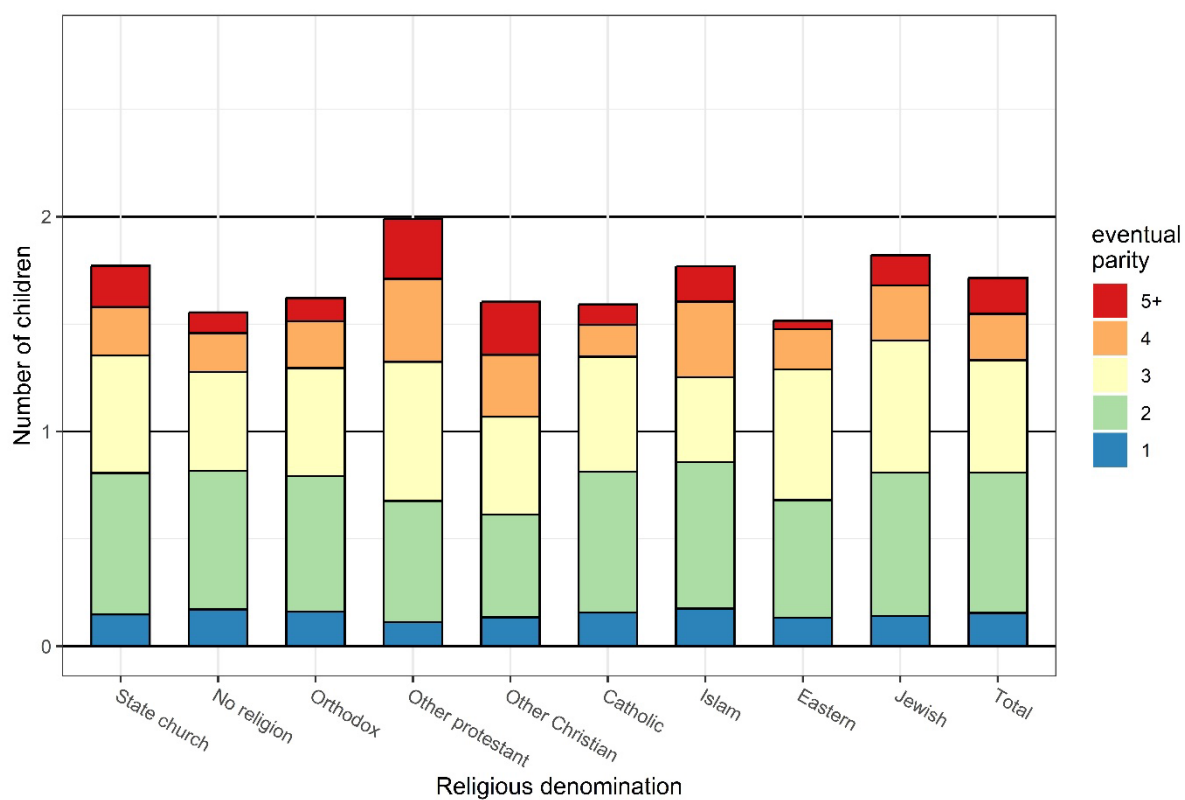
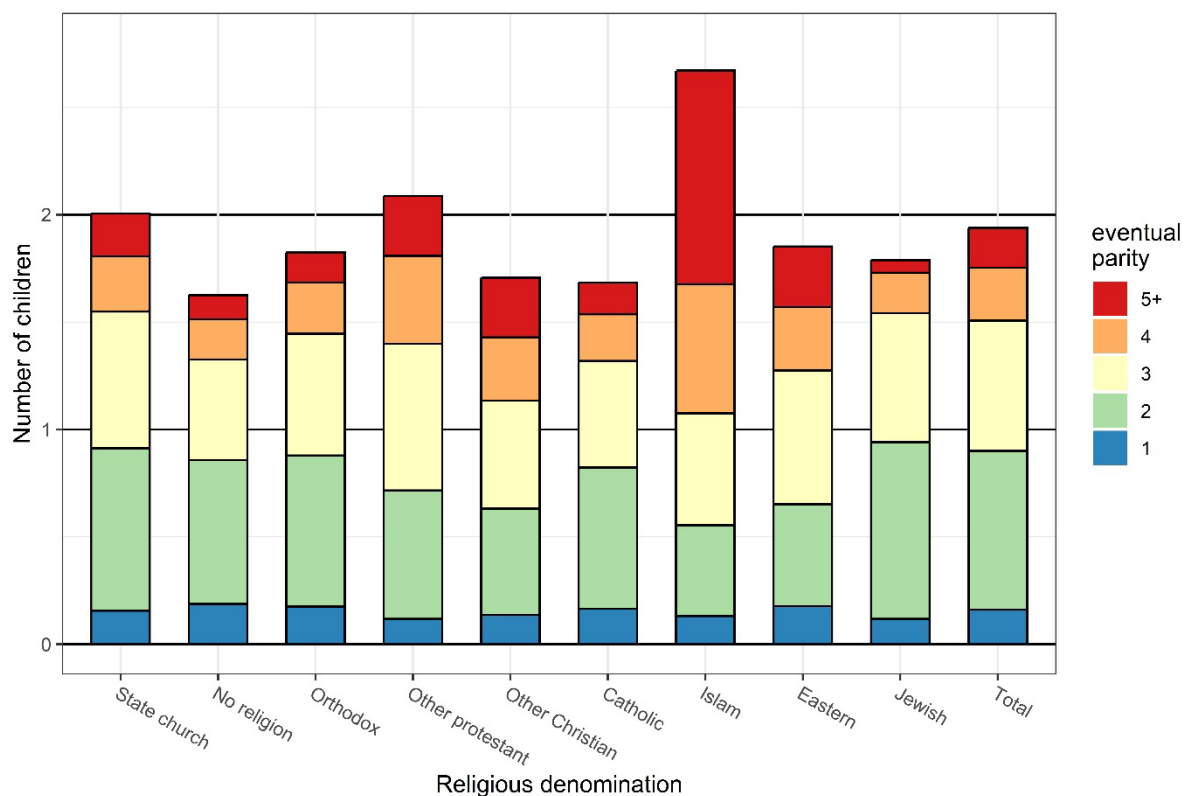
Table 1 presents the mean number of children at age 45 by religious denomination for women and men. Figure 1 breaks each number down by final parity. Fertility differences across religious denominations are larger for women than for men. Among women, members of the state church and other Protestant churches have higher fertility than members of other denominations (except for those registered as Muslim) with, on average, 2.00 and 2.09 children, respectively (Table 1). Among men, members of the state church, other Protestants, and Jews, have the highest fertility with, on average 1.77, 1.99, and 1.82 children, respectively. Both Orthodox and Catholic women and men have lower fertility than men and women of the state church. The “no religious affiliation” group is related to low fertility at, on average, 1.63 children among women and 1.55 children among men. This secularization effect is thus larger

among women than men, as the average number of children is 0.37 lower for women and 0.22 lower for men compared to members of the state church. Other Protestants have, on average, larger families than people in the general population (Figure 1), and this differs little among denominations within this group (Table 1). The “other Christian” group has fewer children than the average population, which is entirely due to low fertility among Jehovah’s Witnesses, while Mormons have large families (Table 1). Both women and men without a religious denomination have relatively small families, as do Orthodox and Catholic women and men. The same holds true of Jewish women and Eastern men. Women who belong to Islam and Eastern religions have larger families than others. The family size of Jewish men is slightly larger than that of the total population.

Table 1. Mean number of children at age 45 by religious denomination, women and men, cohorts born 1956-1975

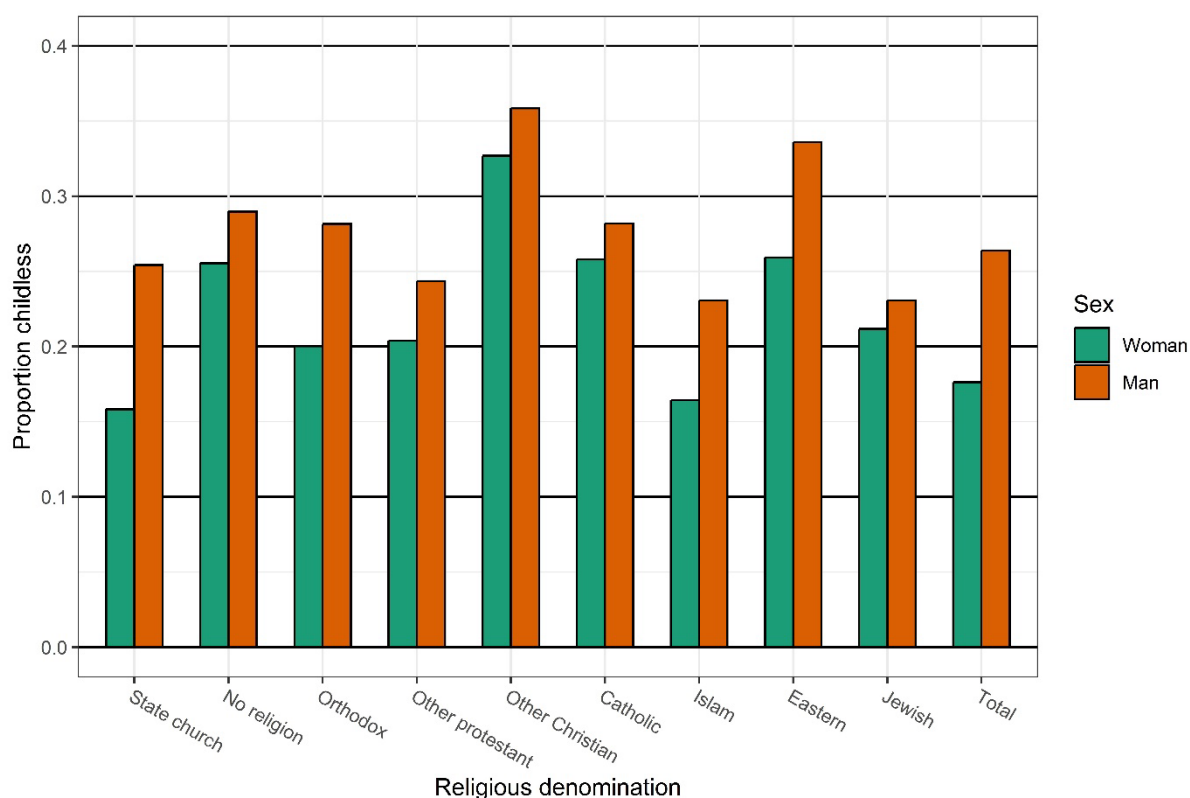
	Women		Men	
	Mean fertility	Group size	Mean fertility	Group size
<b>State church</b>	2.00	509,121	1.77	471,847
<b>No religion</b>	1.63	106,375	1.55	166,611
<b>Orthodox</b>	1.82	6,049	1.62	5,099
<i>Orthodox state church</i>	1.82	6,000	1.62	5,024
<i>Other orthodox</i>	1.69	49	1.75	75
<b>Other protestant</b>	2.09	3,630	1.99	3,248
<i>The evangelical free church of Finland</i>	2.10	2,006	2.02	1,730
<i>Baptists and adventists</i>	2.07	700	1.94	590
<i>Methodists, lutherans, and anglicans</i>	2.01	275	1.73	374
<b>Other Christian</b>	1.71	2,934	1.60	2,399
<i>Jehova’s witnesses</i>	1.56	2,578	1.45	2,061
<i>LDS church (mormons)</i>	2.77	349	2.50	336
<b>Catholic</b>	1.68	496	1.59	543
<b>Islam</b>	2.66	213	1.77	91
<b>Eastern</b>	1.85	135	1.52	128
<b>Jewish</b>	1.79	85	1.82	78
<b>Total</b>	1.94	629,038	1.71	650,044

Figure 1: Mean number of children at age 45 by religious denomination, broken down by contribution of final parity, women and men



For childlessness, we see larger differences by religious denomination than for fertility in general. Figure 2 shows the proportion of women and men who are eventually childless at age 45 by religious denomination. As is typically found in high-income countries, childlessness is higher among men than women due to both sex differences in multi-partner fertility and the larger number of men in the population. The sex difference in childlessness is consistent across all denominations but particularly marked among members of the state church, the Orthodox, and Eastern denominations. Among the non-religious, the sex difference in childlessness is relatively small. The share of childless women is lowest among members of the state church and Islam, at just over 0.15. The highest share of childlessness among women is found among other Christians at every third individual, followed by the non-religious and Catholics, at every fourth individual. Among men, other Christians and Eastern denominations are associated with high levels of childlessness, at more than every third individual. Men without a religious denomination, the Orthodox, and Catholics are somewhat more likely to be childless than members of the state church, while other Protestants, Muslims, and Jews are less likely to be childless.

Figure 2. Proportion childless at age 45 by religious denomination, women and men



Birth cohort, mother tongue, and educational level have only a modest influence on the association between religious denomination and fertility. Table 2 displays the average marginal effects of religion on fertility for women and men, where the state church serves as the reference category. The estimates of Model 1 correspond to differences in means, as can be seen in Table 1 and Figure 1. These estimates remain largely unaffected when we include year of birth, mother tongue, and educational attainment, as in Model 2. Fertility differences by religious denomination are generally reduced when municipality of residence is accounted for (Model 3), and even more so when marital status is added (Model 4). The difference between members of the state church and people with no religious denomination is then -0.25 children for men and -0.17 for women. For all other religious denominations—except Islam among women, Eastern religions among men, and other Christian for both—the difference from the state church is at most 0.10 children, which is not statistically significant. The elevated fertility of members of Islam is amplified when municipality of residence is introduced, and the depreciated fertility of other Christians becomes larger when marital status is included. These patterns are reinforced when religious conversion is added in Model 5. Having changed religion between the ages of 15 and 45 thus underlies part of the fertility difference between members of the state church and the non-affiliated and a minor part of the difference between members of the state church and the other religious denominations. Patterns for women and men are similar in this respect.

(Table 2 here, see end of the manuscript)

For both women and men, converts to the state church, other Protestants, and Muslims have higher fertility than non-converts, while converts to Catholicism and Eastern denominations have lower fertility than non-converts (Figure 3). The difference between converts and non-converts is particularly marked for Islam, albeit driven by a few individuals. Women who became non-affiliated with any religion, which primarily means that they dissociated from the state church, have about 0.2 fewer children than those who remained affiliated with the state church. This secularization effect is smaller in men, at close to zero. Converts are more distinct from the average population than their non-convert counterparts, both when the group they convert to is larger, including no religious denomination, and when it is smaller. Table A1 in the Appendix shows that fertility differences between converts and non-converts are, to a minor extent, related to birth cohort, mother tongue, and educational

level, while municipality of residence and marital status reduce or amplify the differences in a manner similar to what was observed (in Table 2) for comparisons across religious affiliations.

Figure 3. Mean number of children at age 45 by religious denomination, for those who had not and those who had changed religion since age 15, women and men

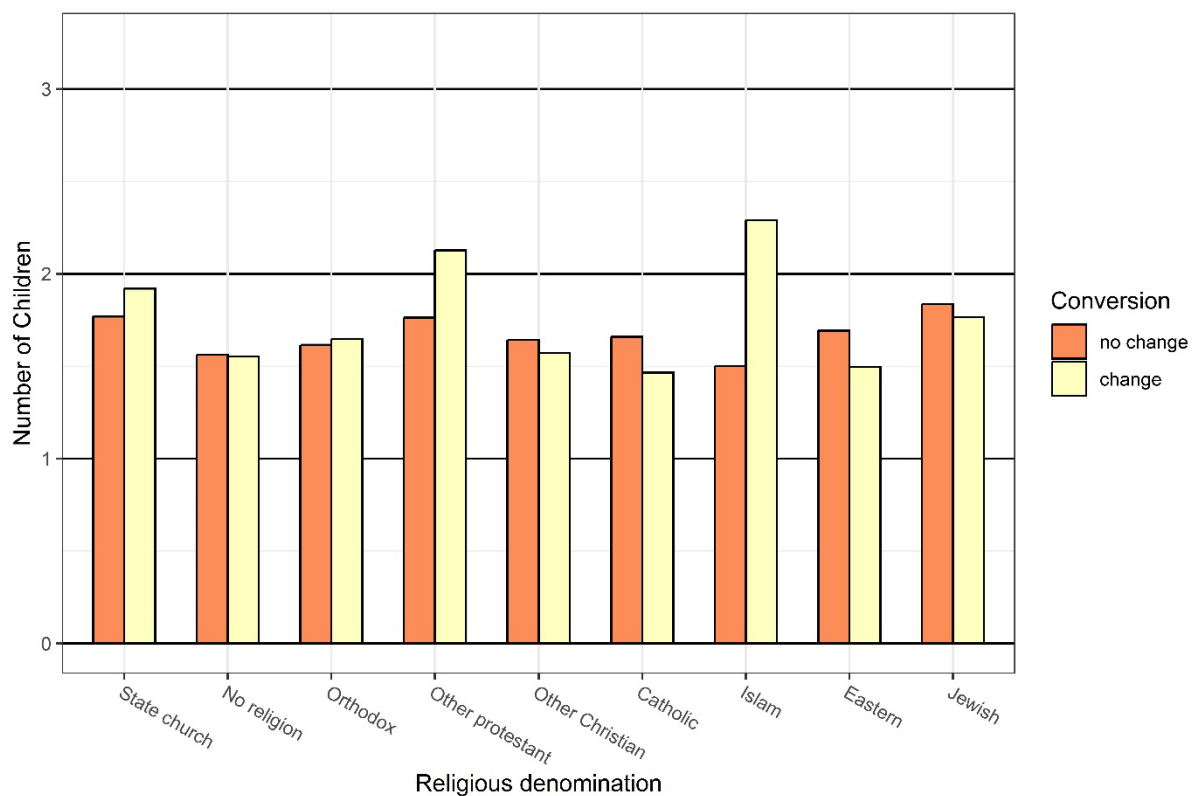
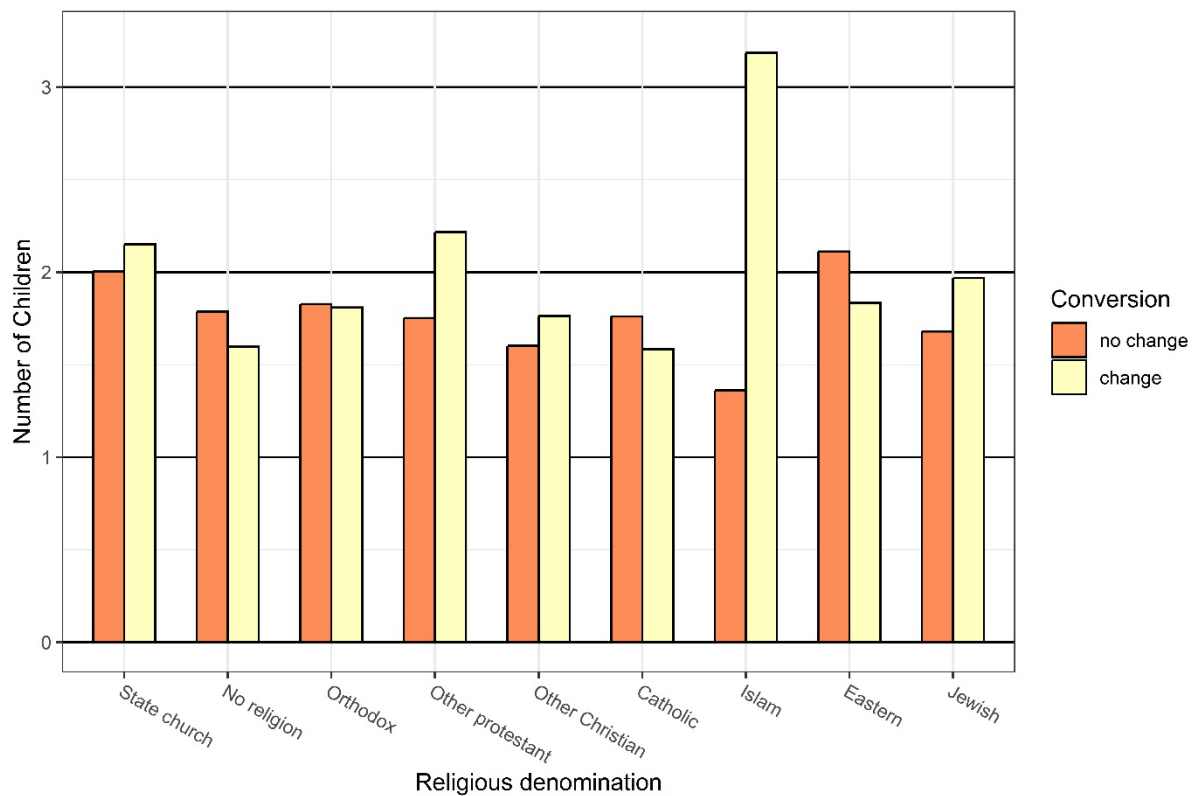
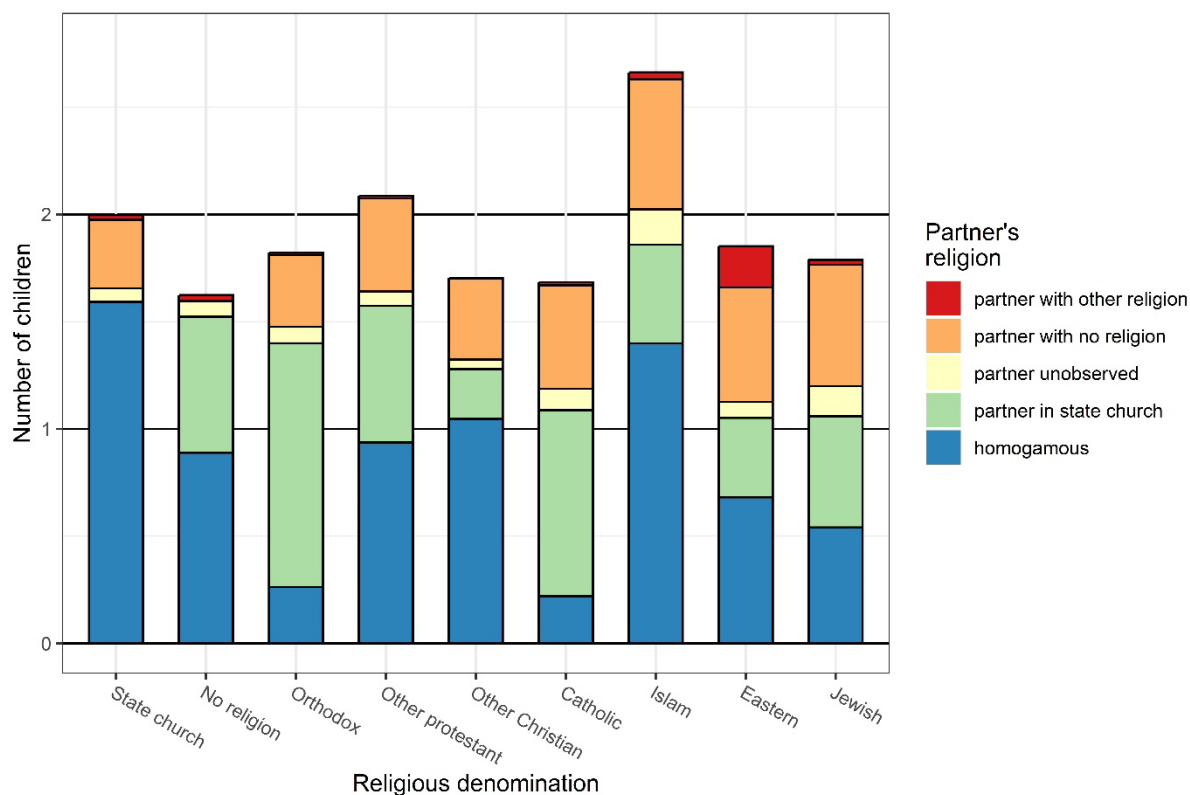
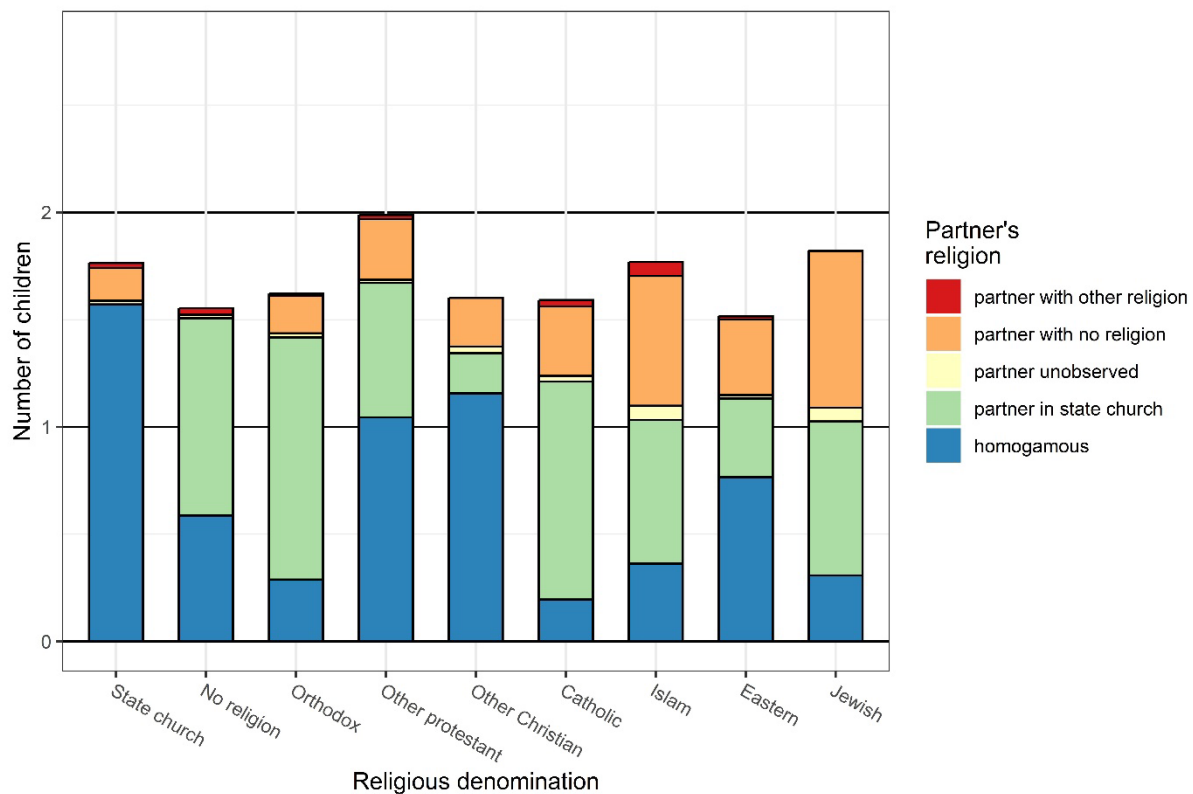


Figure 4 breaks average fertility by religious denomination down by the first childbearing partner's religious denomination. For almost all groups, a larger part of women's than men's fertility is with a partner with no religious denomination. A larger part of men's fertility than women's fertility, on the other hand, is with a female partner who belongs to the state church. These sex differentials largely reflect that more women than men belong to the state church (80.9% vs. 72.6% for the study population), while fewer women than men are religiously non-affiliated (16.9% vs. 25.6%). The highest share of fertility related to homogamous partnerships is found for women of the state church, followed by Islam and other Christians. For men, homogamous partnerships' contribution to fertility is highest for members of the state church, followed by other Christians and other Protestants. For both women and men, the lowest contribution of religious homogamy to fertility is among Catholics, Orthodox, and Jews. The largest sex difference on this account is for the few members of Islam.

Figure 4. Mean number of children at age 45 by religious denomination, broken down by the first childbearing partner's religious denomination, women and men







For both women and men, having a partner with a discordant religious denomination is associated with lower fertility, at about 0.15 fewer children. This is shown in Table 3 (Model 1), where the study population has been restricted to persons with at least one child and for whom the first childbearing partner can be identified in the registers. The association is largely unaffected by birth cohort, mother tongue, educational level (Model 2), municipality of residence (Model 3), and change of religious denomination (Model 5), while inclusion of marital status reduces the mean difference to 0.10 fewer children. Having had more than one childbearing partner is associated with higher fertility, or roughly one more child, and this association is slightly smaller for women than for men. Fertility differences by religious denomination are generally larger for women than for men. On the other hand, fertility differences by partner's religious denomination are generally larger for men than for women. For both female and male fertility, religious denomination is thus more important among women than men.

In most cases, except for denominations with few members, one's partner's religious denomination has the same association with fertility as one's own religious denomination. Effect sizes for religious denomination are, in general, notably smaller among these partnered individuals than in the overall population (cf. Table 2), which largely has to do with the substantial differences in childlessness by religious denomination. When control variables are

included, most of the estimates for religious denomination of individuals and their partners are either close to zero or statistically not significant. However, there are some exceptions. As compared with female members of the state church, other Protestant women have 0.20 more children, other Christian women 0.12 more, and Islamic women 0.88 more (Model 5). For women, having a partner in the “other Protestant” group is associated with 0.18 more children. Compared with male members of the state church, other Protestant men have 0.19 more children, and other Christian men have 0.15 more children. For men, having a partner who is non-affiliated is associated with 0.12 fewer children, Orthodox with 0.09 fewer children, other Protestant with 0.12 more children, Catholic with 0.20 fewer children, and Eastern with 0.24 fewer children.

(Table 3 here, see end of the manuscript)

## **Discussion**

We have identified heterogeneity by religion in completed fertility in Finland. Overall, we found a clear divide between secular and non-secular individuals, which is consistent with most previous research on religion and fertility (Berman et al. 2018; Frejka and Westoff 2008; Hackett 2008; Peri-Rotem 2016). For understanding Finnish fertility, lower fertility among the non-affiliated is the most consequential pattern we observed. In contrast, most other religious groups constitute a comparatively small share of the population in Finland. We found that most other religions have somewhat lower fertility than members of the Finnish state church. This is in contrast to much international research (Berman et al. 2018; Hackett 2008) that has associated religions such as Islam, Evangelical Protestantism, Catholicism, and Mormonism with higher fertility than mainline Protestantism, whose members can be considered comparable with (at least the mostly secular) members of the Finnish state church. Overall, however, differences between denominations are rather modest, and the similarity is perhaps more striking than the differences.

Our findings are a unique contribution in that we provide longitudinal life course data on both religion and fertility. This allowed us to study how changing religion over one’s life course affects fertility. The differences by religion are in most cases rather small, but we found that converts of most religions are typically somewhat more distinct from the general population than non-converts. Our study design allowed us to break down individuals’ fertility histories both by their own parity and—to our knowledge uniquely—their partner’s religions. We could

thus document how homogamy and heterogamy differ across religious groups and affect fertility by religious denomination. Such patterns are predictably affected by the sizes of the different religious groups, as small groups are less likely to have a homogamous partner, but this explains far from all the patterns in how partners' religions and religious homogamy contribute to fertility differences by religious denomination.

We have studied religion as measured by official membership in a government-recognized religious organization. This is both a limitation and strength of our design. An obvious limitation is that it says little about how individual religiosity, as distinct from religious affiliation, affects fertility, which has been a focus of much research on fertility and religion. The primary clear-cut inference related to intensity of religiosity is that the non-affiliated population represents much fewer religious individuals than members of the state church, which is also likely why we generally observe large fertility differentials between these two groups. The members of other Protestant affiliations not linked to the state church also consist of individuals with, on average, higher religiosity. A major strength of our approach is that the data used have no traditional measurement errors, sampling errors, or other missing information. They are also longitudinal, meaning that we measured both fertility and religious denomination in every subsequent year for the complete population for over 50 years.

However, the religious divisions we observed mean that some individuals' religious lives occurred outside the institutions recognized in our study. This is likely more common for recent immigrants to Finland (who were excluded from the study), while rather uncommon for the much larger native Finnish-born population (who were included). For most individuals in the three largest study groups here—members of the state church, the non-affiliated, and the Orthodox—religious denomination is the outcome of a deliberate choice and has clear sociological meaningfulness. Being a member of the state church is associated with substantial additional income tax payments over devotees' lifetimes, and most individuals are unlikely to remain members unless they share at least some affiliation with the state church, though this connection is likely often based on notions of cultural affinity rather than faith-based reasons (Iversen 2006; Xia et al. 2022). We thus measured something sociologically meaningful, even though religiosity, such as weekly church attendance, cannot be measured in our data source, but has been described as rather modest among most members of the state church (Iversen 2006).

As a mirror image, the non-affiliated clearly represent a minority in Finland, comprising individuals who have actively chosen to not be members of the state church, and that choice is likely associated with a set of values linked to strong ideals of secularization. To truly

understand the situation for members of smaller religious minorities in Finland, and before deriving major implications for other nations where similar religions contribute to a much larger share of the national population, a careful consideration of the cultural and historical context and immigration patterns of each group is appropriate. However, this lies beyond the scope of the present study (which focuses on completed fertility using observed life course data), as foreign-born immigration to Finland has occurred on a larger scale during only the past two to three decades.

Our paper serves as a novel contribution to the overall study of religion and fertility through its unique application of administrative registers. In some way, Finland is unlike many other countries in the world, being largely secular but religiously comparatively homogenous, particularly when disregarding the recent inflow of foreign-born immigrants, who cannot be fully observed with regard to completed childbearing. Regardless, many of the patterns we observed have, to our knowledge, not been documented previously, and they could inform research on religion and fertility in other contexts, where religious affiliation can be a powerful determinant of population-level fertility patterns. We also think that many of our findings challenge societal beliefs and stereotypes on the link between fertility and religion, and thus should be of interest to a wide variety of researchers and policy makers.

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We want to thank Erik Carlsson, Vegard Skirbekk, and Weiqian Xia for helpful comments. While carrying out the work we were funded and employed by the "Demographic change and ethnolinguistic identity in an intergenerational perspective: The Swedish-speaking population in Finland (DemSwed)" center of excellence funded by Åbo Akademi University. We in addition received support from the Swedish Research Council for Health, Working life and Welfare (FORTE), grant 2016-07115, the Swedish Scientific Council, grant 2022-02314, and the Global Challenges foundation grant "Sustainable population in the time of climate change".

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Table 2. Average marginal effects (with standard errors and p-values) of religious denomination at age 45 on the number of children at age 45, by sex

	Model 1			Model 2			Model 3			Model 4			Model 5		
	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z
WOMEN															
State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.38	0.00	0.00	-0.38	0.00	0.00	-0.30	0.00	0.00	-0.25	0.00	0.00	-0.20	0.01	0.00
Orthodox	-0.18	0.02	0.00	-0.18	0.02	0.00	-0.12	0.02	0.00	-0.10	0.02	0.00	-0.09	0.02	0.00
Other protestant	0.08	0.02	0.00	0.08	0.02	0.00	0.08	0.02	0.00	-0.03	0.02	0.24	0.02	0.02	0.49
Other Christian	-0.30	0.02	0.00	-0.32	0.02	0.00	-0.29	0.02	0.00	-0.43	0.02	0.00	-0.40	0.02	0.00
Catholic	-0.32	0.06	0.00	-0.31	0.06	0.00	-0.08	0.07	0.24	-0.09	0.07	0.16	-0.07	0.07	0.31
Islam	0.66	0.11	0.00	0.68	0.11	0.00	1.10	0.13	0.00	0.79	0.12	0.00	0.86	0.12	0.00
Eastern	-0.15	0.12	0.19	-0.13	0.12	0.28	-0.01	0.13	0.93	-0.01	0.12	0.91	0.04	0.13	0.75
Jewish	-0.22	0.15	0.14	-0.21	0.15	0.15	0.11	0.17	0.51	-0.02	0.16	0.90	0.00	0.16	0.99
MEN															
State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.22	0.00	0.00	-0.22	0.00	0.00	-0.17	0.00	0.00	-0.14	0.00	0.00	-0.11	0.01	0.00
Orthodox	-0.15	0.02	0.00	-0.15	0.02	0.00	-0.09	0.02	0.00	-0.07	0.02	0.00	-0.06	0.02	0.00
Other protestant	0.22	0.02	0.00	0.20	0.02	0.00	0.20	0.02	0.00	0.01	0.02	0.74	0.03	0.02	0.20
Other Christian	-0.17	0.03	0.00	-0.13	0.03	0.00	-0.10	0.03	0.00	-0.36	0.02	0.00	-0.35	0.02	0.00
Catholic	-0.18	0.05	0.00	-0.22	0.05	0.00	-0.05	0.06	0.41	-0.10	0.06	0.09	-0.08	0.06	0.14
Islam	0.00	0.14	0.99	-0.03	0.14	0.83	0.19	0.16	0.21	0.13	0.15	0.37	0.15	0.15	0.32
Eastern	-0.25	0.11	0.02	-0.28	0.11	0.01	-0.18	0.11	0.12	-0.28	0.11	0.01	-0.26	0.11	0.02
Jewish	0.05	0.15	0.74	-0.02	0.15	0.91	0.24	0.17	0.16	0.24	0.17	0.16	0.24	0.17	0.14

Number of women is 629,038 and number of men is 650,044.

The average marginal effects are based on estimates from Poisson regression models.

Model 1 contains no control variables. Model 2 includes Birth cohort, Mother tongue, and Educational level. Models 3, 4, and 5 stepwise add Municipality of residence, Marital status, and Change of religious denomination (at age 45 vs. age 15).



Table 3. Average marginal effects (with standard errors and p-values) of religious denomination of ego and the partner at age 45, whether they have the same religious denomination at age 45, and number of ego's childbearing partners, on the number of children at age 45, by sex

	Model 1			Model 2			Model 3			Model 4			Model 5		
	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z
WOMEN															
Ego's religious denomination															
State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.15	0.01	0.00	-0.16	0.01	0.00	-0.12	0.01	0.00	-0.10	0.01	0.00	-0.04	0.01	0.00
Orthodox	-0.01	0.02	0.70	-0.01	0.02	0.78	0.02	0.02	0.50	0.00	0.02	0.99	0.02	0.02	0.39
Other protestant	0.22	0.03	0.00	0.21	0.03	0.00	0.20	0.03	0.00	0.14	0.03	0.00	0.20	0.04	0.00
Other Christian	0.17	0.05	0.00	0.16	0.05	0.00	0.16	0.05	0.00	0.07	0.05	0.16	0.12	0.05	0.02
Catholic	-0.01	0.09	0.93	0.00	0.09	1.00	0.12	0.09	0.19	0.09	0.09	0.33	0.12	0.09	0.19
Islam	0.78	0.15	0.00	0.78	0.15	0.00	0.91	0.16	0.00	0.81	0.15	0.00	0.88	0.15	0.00
Eastern	0.24	0.19	0.21	0.24	0.19	0.21	0.30	0.19	0.12	0.26	0.19	0.16	0.34	0.19	0.08
Jewish	0.09	0.21	0.68	0.09	0.21	0.69	0.22	0.23	0.33	0.13	0.22	0.56	0.15	0.22	0.49
Partner's religious denomination															
State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.07	0.01	0.00	-0.07	0.01	0.00	-0.03	0.01	0.00	-0.03	0.01	0.00	-0.03	0.01	0.00
Orthodox	-0.03	0.02	0.22	-0.03	0.03	0.30	-0.01	0.03	0.79	-0.02	0.03	0.46	-0.01	0.03	0.59
Other protestant	0.21	0.04	0.00	0.22	0.04	0.00	0.22	0.04	0.00	0.18	0.04	0.00	0.18	0.04	0.00
Other Christian	0.09	0.05	0.08	0.09	0.05	0.10	0.12	0.05	0.03	0.08	0.05	0.12	0.08	0.05	0.13
Catholic	-0.10	0.06	0.08	-0.10	0.06	0.09	0.02	0.06	0.77	0.00	0.06	0.94	0.00	0.06	0.98
Islam	-0.11	0.09	0.23	-0.11	0.09	0.22	0.01	0.10	0.92	-0.02	0.09	0.86	-0.01	0.09	0.90
Eastern	-0.19	0.18	0.31	-0.18	0.18	0.33	-0.16	0.19	0.40	-0.19	0.18	0.30	-0.19	0.18	0.30
Jewish	0.01	0.17	0.94	0.02	0.17	0.92	0.15	0.18	0.38	0.14	0.17	0.43	0.15	0.17	0.39
Same religious denomination															
Yes	Ref.			Ref.			Ref.			Ref.			Ref.		
No	-0.16	0.01	0.00	-0.16	0.01	0.00	-0.14	0.01	0.00	-0.10	0.01	0.00	-0.10	0.01	0.00
Number of childbearing partners															
1	Ref.			Ref.			Ref.			Ref.			Ref.		
2+	0.93	0.01	0.00	0.91	0.01	0.00	0.93	0.01	0.00	0.97	0.01	0.00	0.97	0.01	0.00

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# MEN

## Ego's religious denomination

State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.08	0.01	0.00	-0.09	0.01	0.00	-0.05	0.01	0.00	-0.05	0.01	0.00	0.01	0.01	0.40
Orthodox	-0.01	0.03	0.61	-0.02	0.03	0.57	0.01	0.03	0.81	-0.01	0.03	0.74	0.00	0.03	0.95
Other protestant	0.23	0.04	0.00	0.23	0.04	0.00	0.23	0.04	0.00	0.15	0.04	0.00	0.19	0.04	0.00
Other Christian	0.11	0.06	0.04	0.12	0.06	0.03	0.16	0.06	0.01	0.11	0.06	0.05	0.15	0.06	0.01
Catholic	-0.02	0.08	0.82	-0.04	0.08	0.66	0.08	0.08	0.33	0.03	0.08	0.73	0.05	0.08	0.55
Islam	-0.03	0.19	0.88	-0.04	0.19	0.81	0.09	0.20	0.65	0.07	0.20	0.74	0.10	0.20	0.63
Eastern	0.00	0.18	0.99	-0.02	0.18	0.91	0.01	0.18	0.97	-0.05	0.17	0.76	0.01	0.18	0.97
Jewish	0.15	0.22	0.49	0.13	0.22	0.54	0.29	0.23	0.20	0.25	0.23	0.27	0.26	0.23	0.24

## Partner's religious denomination

State church	Ref.			Ref.			Ref.			Ref.			Ref.		
No religion	-0.17	0.01	0.00	-0.17	0.01	0.00	-0.14	0.01	0.00	-0.12	0.01	0.00	-0.12	0.01	0.00
Orthodox	-0.10	0.02	0.00	-0.10	0.02	0.00	-0.08	0.02	0.00	-0.09	0.02	0.00	-0.09	0.02	0.00
Other protestant	0.17	0.03	0.00	0.17	0.03	0.00	0.16	0.03	0.00	0.12	0.03	0.00	0.12	0.03	0.00
Other Christian	0.11	0.05	0.04	0.12	0.05	0.03	0.11	0.05	0.04	0.02	0.05	0.69	0.02	0.05	0.69
Catholic	-0.22	0.05	0.00	-0.24	0.05	0.00	-0.15	0.06	0.01	-0.20	0.06	0.00	-0.20	0.06	0.00
Islam	0.10	0.17	0.54	0.11	0.17	0.52	0.20	0.17	0.26	0.21	0.18	0.22	0.21	0.18	0.22
Eastern	-0.23	0.12	0.06	-0.22	0.12	0.06	-0.19	0.12	0.13	-0.24	0.12	0.04	-0.24	0.12	0.05
Jewish	-0.03	0.19	0.88	-0.06	0.19	0.76	0.07	0.20	0.71	0.03	0.19	0.88	0.03	0.19	0.86

## Same religious denomination

Yes	Ref.			Ref.			Ref.			Ref.			Ref.		
No	-0.15	0.01	0.00	-0.15	0.01	0.00	-0.14	0.01	0.00	-0.10	0.01	0.00	-0.10	0.01	0.00

## Number of childbearing partners

1	Ref.			Ref.			Ref.			Ref.			Ref.		
2+	1.08	0.01	0.00	1.10	0.01	0.00	1.14	0.01	0.00	1.17	0.01	0.00	1.17	0.01	0.00

Number of women is 494,802 and number of men is 472,789.

The average marginal effects are based on estimates from Poisson regression models.

Model 1 contains no control variables. Model 2 includes Birth cohort, Mother tongue, and Educational level. Models 3, 4, and 5 stepwise add Municipality of residence, Marital status, and Change of religious denomination (at age 45 vs. age 15).

All results refer to egos with at least one child and for whom the first childbearing partner is identified in the registers.

## APPENDIX

Table A1. Average marginal effects (with standard errors and p-values) of change of religious denomination on the number of children at age 45, by sex, cohorts born 1956-1975

	Model 1			Model 2			Model 3			Model 4		
	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z	dy/dx	S.E.	P> z
<b>WOMEN</b>												
State church, no change	Ref.			Ref.			Ref.			Ref.		
State church, change	0.15	0.02	0.00	0.13	0.02	0.00	0.20	0.02	0.00	0.10	0.02	0.00
No religion, no change	-0.22	0.01	0.00	-0.22	0.01	0.00	-0.11	0.01	0.00	-0.09	0.01	0.00
No religion, change	-0.41	0.00	0.00	-0.40	0.00	0.00	-0.33	0.00	0.00	-0.28	0.00	0.00
Orthodox, no change	-0.17	0.02	0.00	-0.18	0.02	0.00	-0.13	0.02	0.00	-0.08	0.02	0.00
Orthodox, change	-0.19	0.03	0.00	-0.18	0.03	0.00	-0.08	0.03	0.02	-0.14	0.03	0.00
Other protestant, no change	-0.25	0.04	0.00	-0.25	0.04	0.00	-0.23	0.04	0.00	-0.25	0.04	0.00
Other protestant, change	0.21	0.03	0.00	0.22	0.03	0.00	0.20	0.03	0.00	0.06	0.03	0.03
Other Christian, no change	-0.40	0.04	0.00	-0.42	0.04	0.00	-0.37	0.04	0.00	-0.51	0.04	0.00
Other Christian, change	-0.24	0.03	0.00	-0.26	0.03	0.00	-0.24	0.03	0.00	-0.38	0.03	0.00
Catholic, no change	-0.24	0.08	0.00	-0.24	0.08	0.00	0.00	0.09	0.98	-0.02	0.09	0.86
Catholic, change	-0.42	0.09	0.00	-0.40	0.09	0.00	-0.18	0.10	0.07	-0.19	0.10	0.05
Islam, no change	-0.64	0.15	0.00	-0.59	0.16	0.00	-0.34	0.18	0.06	-0.21	0.20	0.28
Islam, change	1.18	0.14	0.00	1.17	0.14	0.00	1.64	0.17	0.00	1.09	0.14	0.00
Eastern, no change	0.11	0.48	0.82	0.14	0.49	0.78	0.21	0.50	0.68	0.17	0.49	0.72
Eastern, change	-0.17	0.12	0.16	-0.15	0.12	0.23	-0.03	0.13	0.84	-0.03	0.13	0.83
Jewish, no change	-0.32	0.18	0.07	-0.32	0.18	0.07	-0.01	0.21	0.96	-0.11	0.20	0.57
Jewish, change	-0.03	0.25	0.89	-0.02	0.25	0.94	0.33	0.29	0.26	0.13	0.27	0.62
<b>MEN</b>												
State church, no change	Ref.			Ref.			Ref.			Ref.		
State church, change	0.15	0.02	0.00	0.17	0.02	0.00	0.24	0.02	0.00	0.06	0.02	0.00
No religion, no change	-0.21	0.01	0.00	-0.19	0.01	0.00	-0.11	0.01	0.00	-0.08	0.01	0.00
No religion, change	-0.22	0.00	0.00	-0.22	0.00	0.00	-0.17	0.00	0.00	-0.14	0.00	0.00
Orthodox, no change	-0.15	0.02	0.00	-0.15	0.02	0.00	-0.09	0.02	0.00	-0.06	0.02	0.01
Orthodox, change	-0.12	0.04	0.01	-0.15	0.04	0.00	-0.06	0.04	0.21	-0.13	0.04	0.00
Other protestant, no change	-0.01	0.04	0.87	-0.02	0.04	0.54	0.00	0.04	0.92	-0.06	0.04	0.10
Other protestant, change	0.36	0.03	0.00	0.34	0.03	0.00	0.33	0.03	0.00	0.05	0.03	0.10
Other Christian, no change	-0.13	0.04	0.00	-0.08	0.04	0.05	-0.04	0.04	0.35	-0.25	0.04	0.00
Other Christian, change	-0.20	0.03	0.00	-0.17	0.03	0.00	-0.15	0.03	0.00	-0.44	0.03	0.00
Catholic, no change	-0.11	0.07	0.11	-0.15	0.07	0.03	0.04	0.07	0.61	-0.04	0.07	0.57
Catholic, change	-0.30	0.09	0.00	-0.34	0.09	0.00	-0.19	0.09	0.04	-0.20	0.09	0.03
Islam, no change	-0.27	0.16	0.09	-0.32	0.15	0.04	-0.12	0.17	0.49	-0.09	0.18	0.61
Islam, change	0.52	0.27	0.06	0.57	0.28	0.04	0.86	0.31	0.01	0.54	0.27	0.05
Eastern, no change	-0.08	0.36	0.83	-0.05	0.37	0.88	0.04	0.38	0.92	-0.15	0.34	0.66
Eastern, change	-0.27	0.11	0.02	-0.30	0.11	0.01	-0.20	0.12	0.10	-0.30	0.11	0.01
Jewish, no change	0.07	0.17	0.70	-0.01	0.17	0.96	0.26	0.19	0.17	0.32	0.20	0.10
Jewish, change	0.00	0.32	0.99	-0.03	0.32	0.92	0.18	0.35	0.61	-0.03	0.31	0.91

Number of women is 629,038 and number of men is 650,044.

The average marginal effects are based on estimates from Poisson regression models.

Model 1 contains no control variables. Model 2 includes Birth cohort, Mother tongue, and Educational level.

Models 3 and 4 stepwise add Municipality of residence and Marital status.

Change of religious denomination refers to religion at age 45 vs. religion at age 15.

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