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Religiosity, Secularity and Fertility in Canada

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Abstract Using several cycles of the Canadian General Social Survey covering cohorts born from the early 1900s onwards, this paper examines how religiosity and secularity associate with fertility in Canada. The analysis shows that among multiple dimensions of religiosity, religious attendance is the strongest predictor of higher fertility in the country. For the latest cycle conducted in 2011, three mutually exclusive groups of secularized women are compared with the actively religious in their fertility behaviour and intentions. All these secularized women are found to have lower fertility rates compared with the actively religious. Among them, the strictly seculars, a proxy identifier for the atheists, have the lowest fertility and the highest likelihood of remaining childless. Various implications are discussed.

Keywords Fertility · Religiosity · Secularity · Canada

1 Introduction

Changes in family arrangement and fertility behaviour in the Western world have been strongly linked to secularization (Goldscheider 2006; Gorski and Altinordu 2008) and its ensuing decline of the significance of religion in social and private life (Norris and Inglehart 2004). These changes induced a shift away from the influence of normative authorities to individual autonomy and the rejection of irreversible

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choices (Bumpass and Lu 2000; Impicciatore and Billari 2012; Wolfinger and Wilcox 2008). The consequences of this value shift are summarized in the Second Demographic Transition thesis, predicting a sustained sub-replacement fertility and the spread of alternative family arrangements (Lesthaeghe and Neidert 2006; Surkyn and Lesthaeghe 2004). In comparative studies, the decline of religion has been often offered as the explanation for the convergence of fertility rates among different religious denominations in the Western world (Goldscheider and Mosher 1991; Mosher et al. 1992; O'Gráda and Walsh 1995), and the so-called end of Catholic fertility (McQuillan 2004; Philipov and Berghammer 2007).

Still, recent studies consistently report a positive correlation between religiosity and fertility (Adsera 2006a; Berghammer 2012b; Frejka and Westoff 2008; Kaufmann et al. 2012), even in countries advanced in secularization (Peri-Rotem 2016). In addition, in spite of the fading cross-denominational fertility differences, recent scholarship suggests that within denominations (McQuillan 2004; Philipov and Berghammer 2007), the fertility difference between the religiously committed and the nominally affiliated is on the rise (Kaufmann et al. 2012; Stonawski et al. 2015). For instance, Peri-Rotem (2016), using data from Britain, France and the Netherlands, reports that religious affiliation and practice continue to be important determinants of fertility patterns in all these countries. Peri-Rotem (2016) additionally finds that the fertility gap associated with the degree of religious commitment is increasing in the Netherlands, one of the least religious countries in the world. Comparable views have been expressed in Kaufmann et al. (2012) and Stonawski et al. (2015).

According to the data from the 2010s, above 20% of Canadians claim no religious affiliation (Dilmaghani 2017a). About half of this group has no tie with either religion or spirituality, even in a private manner (Dilmaghani 2017a). More strikingly, almost 45% of Canadians, religiously affiliated or not, state that they never attend religious services (Dilmaghani 2017a, b; Wilkins-Laflamme 2015). Eagle (2011) reports that the Canadian religious attendance rates have declined by about 20 points from 1986 to 2008. The francophone province of Québec in which 24% of the population resides stands out for its greater trends of religious attendance decline (Bibby et al. 2007; Eagle 2011; Zubrzycki 2016). The low rate of religious service attendance in Canada is all the more remarkable in the light of the well documented over-reporting of church attendance rates in the country (Brenner 2012).

While some scholars believe that the changes in the religiosity patterns in Canada correspond to a classic version of secularization (Eagle 2011; Hay 2014; Thiessen 2012), the alternative characterization of "religious polarization" is recently put forth by a few scholars (Bibby 2011; Reimer 2017; Wilkins-Laflamme 2014, 2016, 2017). In the context of Western countries, the polarization hypothesis refers to the pattern in which religious decline is accompanied with the stabilization in size of a cluster of actively religious individuals (Martin 1978, 2005). As such, the fall in average religiosity figures is fuelled by a fall in religious involvement of those in the religious middle ground. Empirical evidence congruent with the polarization hypothesis is recently produced regarding Canada (Wilkins-Laflamme 2014) and a number of other Western countries (Achterberg et al. 2009; Kaufmann

et al. 2012; Ribberink et al. 2013). Such emerging patterns and their complexity call for more nuanced distinction among different varieties of the nonreligious.

As early as in the 1960s, Vernon (1968) acknowledges that certain individuals with secularized belief systems still identified with a religion, especially when religion was a marker of their ethnic identity (Sherkat 2008) or to avoid the social costs associated with an overt profession of a lack of belief (Baker and Smith 2009; Edgell et al. 2006, 2016). Conversely, among those who report no religious affiliation, referred to as *religious nones*, many have retained superempirical beliefs (Baker and Smith 2009; Davie 2008; Vernon 1968). In their influential papers, Hout and Fischer (2002, 2014) demonstrate that regardless of the individuals' own belief system, those who disagree with the American religious right on issues such as abortion and homosexuality tend to report no religious affiliation in the social surveys. Putnam et al. (2010) for the USA and Wilkins-Laflamme (2015) for Canada echo these findings. Wilkins-Laflamme (2015) shows that among the unaffiliated Canadians, many have opted for "private spirituality" and maintain worldviews which include belief in the superempirical. Little is known about the sociodemographic behaviour of the growing and diverse minority formed by the nonreligious (Baker and Smith 2009; Lim et al. 2010; Vernon 1968).

In face of the complexities of religious landscapes in Western countries, the association between religiosity and fertility has become an empirical matter. A protracted trend of religious decline implies that the differences between the religious and the nonreligious should shrink overtime. Religious polarization, on the other hand, entails increasing cleavages between the actively religious and the nonreligious (Kaufmann et al. 2012; Reimer 2017; Stonawski et al. 2015; Wilkins-Laflamme 2016, 2017). Furthermore, with the growth and vibrancy of secular movements (Baker and Smith 2009), the unaffiliated cannot be treated as a monolithic group who adheres to the same worldview and lifestyle. This study, using repeated cross-sectional data which cover cohorts born from the 1900s to the 1980s, examines how the association between religiosity and fertility has evolved in Canada. For the most recent data, this paper distinguishes among different types of secularized women and compares their fertility outcomes with the actively religious. The remainder of this paper is organized as follows. The next section reviews the related literature. Section 3 presents the data. Section 4 discusses the methodology. Section 5 reports the results. A discussion and the concluding remarks follow.

2 Religiosity and Fertility in Recent Scholarship

Theoretical conceptions linking religiosity to fertility emphasize the importance according to family and its sanctity in most religions (Dobbelaere 1999; Lehrer 2004; Norris and Inglehart 2004; Sherkat 2000). Differences in religious teachings have been seen as the root cause of fertility gaps among Christian groups. The Catholic Church has maintained a strong opposition to divorce and views the main purpose of marriage in procreation. The higher fertility of Catholics in comparison with Protestants was often seen as the consequence of pronatalist Catholic teachings and its proscription of the use of artificial means of contraception (Chatters and

Taylor 2005; McQuillan 2004). Protestant Churches, which nonetheless endorse traditional family values, historically had a less restrictive stance towards these matters (Iqbal et al. 2009). This ideological difference has been reflected in the long-standing fertility gaps between Canadian Roman Catholics and Protestants (Balakrishnan et al. 1975; Burch 1966).

Religiosity has multiple dimensions (Sherkat and Ellison 1999; Voas 2009). Public aspects of religious involvement are commonly distinguished from its private facets in the influence they exert on fertility. Religious affiliation, a manifestation of belonging to a group, is suggested to have a greater effect on behaviour when it is also a marker of ethnic identity (Burr et al. 2011; McQuillan 2004). The intensity of religious involvement is expected to reinforce the effects associated with religious identity (Adsera 2006b; Lehrer 2004). Some scholars suggest that since religious service attendance requires a larger investment of time, it is a stronger predictor of fertility than affiliation status (Adsera 2006a; Philipov and Berghammer 2007), personal belief and prayer (Peri-Rotem 2016; Storm and Voas 2012). Additionally, religious services provide religious organizations with a venue for the communication of their norms and a place to exercise informal social pressure on the members to comply with them (Régnier-Loilier and Prioux 2008; Skirbekk et al. 2010). Finally, with the decline of religion, only the highly committed affiliates continue to regularly attend religious services. Hence, due to this selection process, the differences in fertility behaviour between those who regularly attend religious services and non-practising members may become more pronounced (Davie 2007; Kaufmann et al. 2012). The extant empirical evidence is consistent with these assertions.

According to Adsera (2006b), religious service attendance has become a more salient determinant of fertility among younger Europeans. Philipov and Berghammer (2007) also find that religious attendance is a slightly stronger distinguishing attribute than self-reported religiosity or affiliation status. Frejka and Westoff (2008) find that while the self-reported importance of religion in one's life is the more accurate predictor of fertility in Western Europe, church attendance is more relevant for southern European countries. For the Netherlands, Berghammer (2012b) finds that among different markers of religiosity, religious attendance is the strongest predictor of future childbearing. The study by Berghammer (2012b) is important for identifying the direction of causality from earlier religious attendance to later life fertility. Along the same lines, Stonawski et al. (2015) acknowledge the growing influence of religious intensity, rather than religious identity, on fertility gaps in Spain.

Furthermore, religiosity influences fertility through several indirect mechanisms. Religious commitment affects a woman's educational and labour market attainment (Adsera 2011; Dilmaghani 2017b; Lehrer 2004; Sander 2002) and thus modifies the opportunity cost of raising children (Guetto et al. 2015). Religious attendance enhances social capital among regular participants (Berghammer 2012b; Billari et al. 2006; Chatters and Taylor 2005). Involvement in religious communities helps with the creation of networks of mutual aid (Lim and Putnam 2010; Waite and Lehrer 2003) where emotional and practical support are exchanged (Chatters et al. 2002; Krause et al. 2001). These supports may positively impact fertility by

reducing the perceived costs of childbearing and alleviate the stressors of family expansion (Krause et al. 2001; Mahoney et al. 2003). Moreover, religiosity is found to impact union formation patterns such as age at marriage and likelihood of divorce (Cochran et al. 2004; Lehrer and Chiswick 1993) which are impactful for subsequent fertility (Adsera 2006b; Berghammer 2012a; Dilmaghani 2017c).

In addition to these individual influences, religious organizations increase household incentives to have children through their family-oriented services. For instance, the Roman Catholic Church has traditionally provided a variety of services to their affiliated households, such as day care, schools and medical assistance. These services lower the cost of raising children for the affiliated families. According to Berman et al. (2012), the attrition of nuns in the aftermath of the Second Vatican Council resulted in the decline of those services, raising the cost of childrearing, and thus reducing fertility among Roman Catholics. Finally, religion may influence national policies, and thereby, the public provision of pro-family and child-friendly social services by governments and their secular institutions (Berman et al. 2012; Hertel and Hughes 1987).

The scholarship concerned with socio-economic characteristics and outcomes of secular individuals remains small (Bainbridge 2005; Cragun et al. 2012; Dilmaghani 2017a, b; Edgell et al. 2006, 2016, 2017). A few studies have explicitly compared the affiliated with the unaffiliated. Using Spanish cross-sectional data from 1985 and 1999, Adsera (2006a) reports that with the spread of secularization, fertility differences between practising Catholics and non-practising women have grown. Philipov and Berghammer (2007) report that religiously inclined European women have more children than their nonreligious counterparts. Frejka and Westoff (2008) find that European and American women who identify as Protestants or Catholics have higher fertility rates compared with unaffiliated women. In line with other European studies, Berghammer (2012b) reports that religiously affiliated German women underestimate the costs of childbearing and overestimate the benefits of children compared with their nonreligious counterparts.

For Canada, the association between religiosity and fertility is scantily studied and has not been updated in the past two decades. Earlier studies document significant fertility differences between Catholics and Protestants (Balakrishnan et al. 1975; Burch 1966; Haan 2005; Henripin 1972). Balakrishnan and Chen (1990) report that fertility differentials associated with religious identity have shrunk in Canada, but religiosity remains a significant marker. They find that more religious women were less likely to cohabit before marriage, more likely to stay in their first marriage, and have significantly larger families compared with less religious women. The 1960s onwards trends of religious decline in the Catholic province of Québec have played an important role in the closing of the Catholic–Protestant fertility gap (Henripin and Lapierre-Adamcyk 1974; Lapierre-Adamcyk and Lussier 2003; McQuillan 2004). The province of Québec underwent a "Quiet Revolution", in the 1960s. The *Quiet Revolution* of Québec was characterized by an effective secularization of the social institutions of the province. Notably, the *Quiet Revolution* led to the direct control of the provincial government over education system, previously closely associated with the Roman Catholic Church (Gauvreau 2005; Gauvreau and Laplante 2016). A few studies have focused on the higher

fertility of Canadian Hutterites, mainly residing in the Province of Alberta (Curtis-White 2002; Laing 1980). Trovato (1986), using retrospective data from women residing in Alberta, reports that teenage religiosity is a statistically significant predictor of later-life fertility. The present paper updates and complements previous scholarship by assessing how various dimensions of religiosity associate with fertility in Canada. Moreover, this paper pays a special attention to the growing and diverse minority formed by secularized individuals.

3 Data and Descriptive Statistics

Statistics Canada started conducting the Canadian General Social Surveys (GSS) in 1985. The GSS data sets are nationally representative probability samples of the non-institutionalized population of Canada, 15 years of age or older (Statistics Canada 2017). In all the GSS cycles, the data are collected through phone interviews. The respondents are reached through "Random Digit Dialling" of the phone numbers registered as "in service for residential use" in Statistics Canada's administrative sources (Statistics Canada 2017). The present paper uses the cycles conducted in 1985, 2001 and 2011. The oldest cohorts surveyed in the GSS-1985 were born around 1900. The youngest cohorts with near completed fertility in the GSS-2011 were born around 1971. All these surveys collect data on the affiliation status and religious attendance of the respondents.

In the analysis of total fertility, the samples are restricted to women aged 40 and older. For younger women, the intended fertility is examined. To avoid the complications arising from the changing origin of immigrants to Canada and their likely differences with the native regarding both religiosity and fertility, immigrants are excluded. With this restriction, at least 95% of the affiliated respondents belong to a Christian denomination across the surveys (Statistics Canada 2005). The largest non-Christian group, when immigrants are excluded, is Jewish with around 1% share (Dilmaghani 2017d).

Throughout the period, Roman Catholics remained the largest religious group, followed by Protestants when all denominations were combined. Figure 1 depicts the total fertility of the religiously affiliated and the unaffiliated women by birth cohort. Based on the religious attendance question of the GSS cycles, two segments of the population are separated. One segment pertains to women who report they attend religious services at least once a week, and the other is the religiously affiliated women who assert that they never attend religious services. Figure 2 shows the total fertility of those who attend religious services at least weekly and those who never attend by birth cohort. Compared with the affiliation status, the fertility difference between those who attend religious services weekly and those who never attend seems to be widening.

Table 1 reports the descriptive statistics extracted from these three cycles of the GSS. As the data show, all the metrics point to a sustained religious decline, which has somewhat intensified between 2001 and 2011. While the share of the unaffiliated and the percentage never attending religious services have persistently increased, the share of those who attend religious services at least weekly has

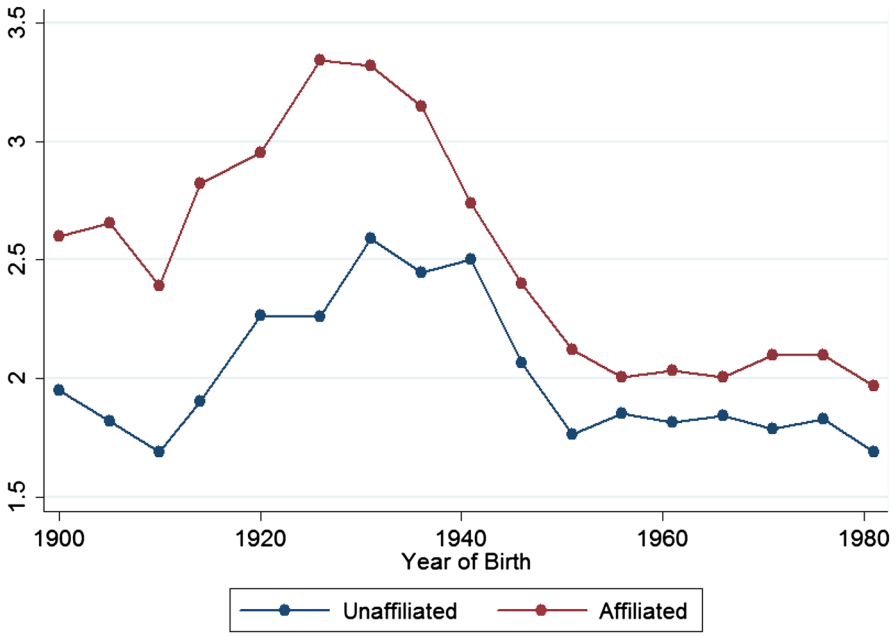

Fig. 1 Total fertility rates by birth cohort, 1900 to 1985. *Note*: The data points are driven from the Canadian General Social Surveys of 1985, 2001 and 2011

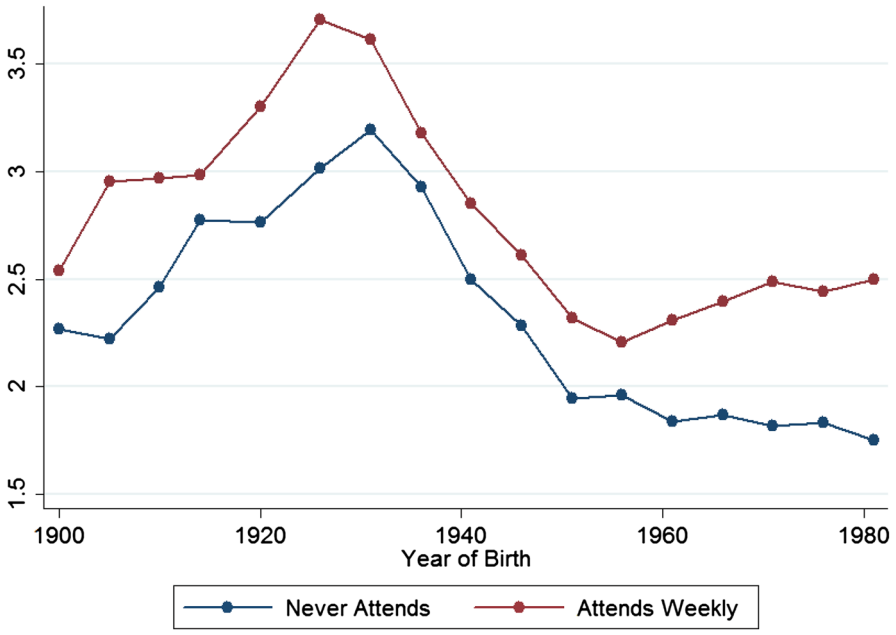

Fig. 2 Total fertility rates by birth cohort, 1900 to 1985. *Note*: The data points are driven from the Canadian General Social Surveys of 1985, 2001 and 2011

Table 1 Descriptive statistics, GSS 1985, 2001 and 2011

	GSS-1985		GSS-2001		GSS-2011	
	Share %	Children Age > 40	Share %	Children Age > 40	Share %	Children Age > 40
Unaffiliated	7.2	2.4	14.2	1.9	20.3	1.8
Catholic	47.6	3.2	46.4	2.5	42.2	1.9
Protestant	35.6	2.8	34.1	2.5	33.1	1.4
Other religions	8.7	2.6	3.0	2.3	3.2	1.2
Never attends	18.4	2.7	25.0	2.3	43.4	1.5
Attends weekly	30.6	3.1	20.0	2.9	16.2	2.2
Sample size/mean	5113	3.0	11,214	2.4	10,266	2.3

The data source is the GSS of 1985, 2001 and 2011 of Statistics Canada. Sample is limited to females

continuously fallen. The Catholic fertility, starting off higher than all other groups, appears to be equal to that of Protestants in 2011. This pattern is largely driven by the strong fall in the fertility of Catholic francophones, mainly residing in Québec (Henripin and Lapierre-Adamcyk 1974; Lapierre-Adamcyk and Lussier 2003; McQuillan 2004), after the 1960s *Quiet Revolution* of this province (Gauvreau 2005; Gauvreau and Laplante 2016).

Given the greater quality of religious questions in the GSS of year 2011 (GSS-2011), a more complete analysis is conducted for this cycle. The main advantages of this cycle are as follows. First, this cycle contains four religion-related questions. The GSS-2011 records the affiliation status, the self-reported importance of religious belief, the frequency of private prayer and the frequency of religious service attendance. The older cycles only contain two questions pertaining to the affiliation status and religious attendance. Second, in the older cycles, the respondents of no religious affiliation were not asked the religious attendance question, under the inaccurate assumption of their absence of involvement (Wilkins-Laflamme 2015). Unlike for the older cycles, the coverage of religious intensity questions in the GSS-2011 is universal. Third, the wording of this cycle's questions refers explicitly to both religion and spirituality. These features of the GSS-2011 allow for a fine distinction among the nonreligious individuals which was not feasible with previous data.

The four religion-related questions of the GSS-2011 are as follows. First, religious affiliation is surveyed, allowing for the response of *none*. Respondent affiliation is recorded if an individual is no longer a practising member, but still identifies with a given group. The three other questions invite the respondents to (1) rank the importance of their religious or spiritual beliefs in their way of life, from 1 for *very important* to 4 for *not important at all*; (2) report their frequency of religious or spiritual practice on their own, including prayer, meditation or any kind of worship practised at home; and (3) report their frequency of religious service attendance. To compare relative importance of each dimension of religiosity for

fertility outcomes, all these indicators are used in the regressions as explanatory variables.

Moreover, these questions are exploited to distinguish various types of the nonreligious from each other. To this aim, three mutually exclusive categories of nonreligious individuals are conceived. The first group, titled "strictly-secular", pertains to those who report no religious affiliation, never attend religious services, and never engage in religious or spiritual practices on their own. Strictly secular women are 6.8% of the sample. The characteristics of these women seem to reflect most closely those of the atheists. The remainder of the respondents of no religious affiliation are termed "unchurched believers", following Hout and Fischer (2002). The unchurched believers report no religious affiliation; however, they do not completely abstain from religious or spiritual involvement, attending religious services at times or practising on their own. Putnam et al. (2010) use the term "liminal nones" for these individuals. Davie (1994, 2002) refers to the stance of this group of unaffiliated individuals as "believing without belonging". The unchurched believers are 13.2% of this sample.

The third group, titled "nominal affiliates", pertains to the religiously affiliated respondents who state that they never attend religious services. Nominal affiliates constitute 26.6% of the sample. Regardless of individual belief system, people may remain nominally affiliated with organized religion, when religion is linked to one's ethnic identity (Baker and Smith 2009; Sherkat 2008), or to avoid the social costs of overtly professing a lack of religious faith (Edgell et al. 2006, 2016; Gervais 2011). Voas (2009) describes the stance of the affiliates who show no or very little engagement with their religion as "fuzzy fidelity". These affiliates are titled "nevers" by Bibby (2007), referring to their religious non-attendance. The growth in the share of nominal affiliates, or those who "belong without believing", in Europe is consistently reported (Kaufmann 2010, Kaufmann et al. 2012; Marchisio and Pisati 1999; Voas 2009). The remainder of the religiously affiliated respondents, 51.9% of the sample, are referred to as "actively religious" in this paper.

As the above review shows, this typology is well grounded in religious scholarship where nominal affiliates are usually distinguished from other affiliates (Stonawski et al. 2015; Voas 2009; Wilkins-Laflamme 2014). Likewise, among the unaffiliated, those who have abdicated their affiliation with organized religion to the benefit of private spirituality are commonly distinguished from those with worldviews which do not include belief in the superempirical (Baker and Smith 2009; Hout and Fischer 2002, 2014; Lim et al. 2010; Vernon 1968). Descriptive statistics on the degree of religious involvement of all these groups alongside their fertility outcomes can be found in Table 2. These data show some non-negligible fertility gaps among these different types of secularized women, in comparison with their actively religious counterparts. Multivariate regression analysis is employed to measure the extent of the *ceteris paribus* fertility differentials.

Table 2 Descriptive statistics, GSS 2011

	Share	Fertility	Fertility	Childless	Importance of belief	Attendance	Prayer
	%	(Any age)	(Age ≥ 40)	(Age ≥ 40)	0–3	0–4	0–4
Actively religious	51.9	1.8	2.4	11.8	2.3	2.6	3.1
Nominal affiliate	26.6	1.7	2.1	14.3	1.6	0	1.8
Unchurched believer	13.2	1.3	2.0	19.2	1.7	0.4	1.6
Strictly secular	6.8	1.0	1.8	19.1	0	0	0
Catholic	42.2	1.8	2.2	14.1	1.9	1.6	2.5
Protestant	33.1	1.9	2.4	10.8	2.3	1.9	2.8
Other religions	3.2	1.4	2.1	13.6	2.3	1.9	2.7
Unaffiliated	20.3	1.2	1.9	19.2	1.1	0.3	1.1
Affiliated	79.7	1.8	2.3	12.6	2.1	1.7	2.6
Sample mean	100	1.7	2.2	13.6	1.9	1.4	2.3

The data source is the GSS of 1985, 2001 and 2011 of Statistics Canada. Sample is limited to females

4 Methodology and Limitations

The first set of multivariate estimations is concerned with total fertility. The dependent variable is the number of children a woman has given birth to, for those with near completed fertility, i.e. women aged 40 or above. The Poisson distribution is assumed. The generic formulation of the equations is as follows:

$$ln[E(Child|Z)] = \beta_0 + X\beta + \sum \delta_i R_i + \varepsilon \quad (1)$$

The left-hand-side variable *Child* is the total number of children born to a woman aged 40 and above. The matrix Z contains all the regressors, inclusive of the variables of interest and the controls. The matrix $\boldsymbol{X}$ incorporates the sociodemographic controls, which consists of age and age squared, marital status, education, income, ethnic background and locations. The variables of interest, denoted by R_i, are the religiosity indicators, and ε stands for the stochastic error term. Different religiosity indicators are used in different versions of Eq. (1). First, three dummies taking the value of 1 for (1) the unaffiliated; (2) Protestants; and (3) Other religions are included, leaving Roman Catholics as the reference category. In another version of this equation, religiosity indicators are three dummies taking the value of 1 for women who (1) attend religious services at least weekly; (2) attend religious services at least monthly; and (3) never attend religious services. The reference category in this set of regressions is those who report attending religious services a few times a year. The main variables used in the regressions are listed and defined in Table 3.

Table 3 Definitions of main variables

Variable	Definition
Importance of religious belief	The GSS-2011 question is framed as: "How important are your religious or spiritual beliefs to the way you live your life?" The coverage of this question is all respondents. The response categories are 1: very important; 2: somewhat important; 3: not very important; and 4: not important at all
Private prayer	The GSS-2011 question is framed as: "In the past 12 months, how often did you practice religious or spiritual activities on your own? This may include prayer, meditation and other forms of worship taking place at home or in any other location". The coverage of this question is all respondents. The response categories are 1: at least once a week; 2: at least once a month; 3: a few times a year; 4: at least once a year; and 0: never
Religious attendance	The GSS-2011 asks all respondents to report their religious attendance choosing from the following categories: 1: at least once a week; 2: at least once a month; 3: a few times a year; 4: at least once a year; and 0: never
Unaffiliated	A dichotomous variable taking the value of one for the respondents who opted for the category of "No religion", in response to the GSS-2011 question on religious affiliation
Nominal affiliate	A dichotomous variable taking the value of 1 for a religiously affiliated female who states that she never attends religious services
Unchurched believer	A dichotomous variable taking the value of 1 for a religiously unaffiliated female who is not a strictly secular, as defined below
Strictly secular	A dichotomous variable taking the value of 1 for a religiously unaffiliated female who opts for the response of "not important at all", to the question on the importance of belief, and "never", to the private prayer and religious attendance questions, stated in the above
Other religions	Buddhist, Jehovah's Witness, Jewish, Hindu, Muslim, Christian Orthodox, Other faiths
Fertility intention	Defined based on the GSS-2011 questions regarding the total number of children a respondent currently has plus the number of children she intends to have in future

See Statistics Canada, General Social Survey of 2011; Guide, Available at: http://tinyurl.com/phylm2u

In the next set of regressions, religiosity indicators reflect different dimensions of religious commitment, which are (1) importance of religion in one's life; (2) religious attendance; and (3) private prayer. Finally, the secular identity indicators of (1) nominal affiliate; (2) unchurched believer; and (3) strictly secular are included in the regressions. This set of regressions, comparing the outcomes of secularized women, is only done for the GSS cycle conducted in 2011. All these equations are estimated using Poisson regression.

The subsequent part of this study examines the association of religiosity with the likelihood of childlessness. The dependent variable is a dummy taking the value of 1 for women of 40 years of age or older who state they do not have children. The generic formulation of the equations, estimated using Probit, is as follows:

$$Pr(No\ Child|Z) = \Phi\left(\beta_0 + X\beta + \sum \delta_i R_i + \varepsilon\right) \quad (2)$$

The left-hand-side variable, *No Child*, is a dichotomous variable taking the value of 1 for women who report having no children. The notation Φ stands for a standard logistic function, and ε denotes the stochastic error term. The matrix Z contains all the regressors, inclusive of the variables of interest and the controls. The matrix $\boldsymbol{X}$ incorporates all the sociodemographic controls, and the variables denoted by R_i are religiosity indicators. The religiosity indicators and the controls remained the same as specified for Eq. (1). These equations are estimated using Probit. In the tables, the marginal effects of Probit coefficients are computed and reported.

The GSS-2011 contains a question on the intentions of the respondents for having additional children. Using this question in combination with the question on the number of children a respondent already has, another dependent variable is constructed. This dependent variable captures the total number of children a respondent has plus the number of additional children she intends to have in future. Using this dependent variable, both Eqs. (1) and (2) are estimated for women younger than 40. Other age cut-offs such as 35 and 30 are also used to assess the sensitivity of the conclusions to the age partitioning.

Fertility intentions, as opposed to actual fertility, are examined in several fields, such as the study of family planning (Ajzen and Klobas 2013; Miettinen et al. 2015). Some scholars argue that individual intentions about future fertility are significant predictors of later-life behaviour (Bumpass 1987; Rindfuss et al. 1988; Schoen et al. 1999; Thomson 1997; Westoff and Ryder 1977). Other researchers posit that fertility intentions are transient phenomena which may inaccurately translate into actual fertility (Brown and Eisenberg 1995; Harknett and Hartnett 2014; Miller and Pasta 1995; Thomson et al. 1990; Thomson 1997; Trent and Crowder 1997; Westoff and Ryder 1977). For instance, Harknett and Hartnett (2014), using data from the European Social Survey of 2004 and 2007, find that for every 100 births intended, about 60 births occur. In these countries, previous childbearing, age, marital status and the strength of fertility intentions are found to moderate the relationship between women's childbearing plans and actual births (Harknett and Hartnett 2014). In spite of this limitation, fertility intention question of the GSS-2011 is used in the analysis. Although caution might be applied in reading the results of this analysis, they provide some additional insights on the differences in fertility intentions by degree of religiosity and secularity.

Other limitations of this study must be noted. First, the survey reports of religious attendance rates have found to be biased upwards. Brenner (2011, 2012) finds that in Canada and the USA, religiously affiliated survey respondents consistently over-report their service attendance. This data limitation is rather consequential for tracing the religious trends. But, assuming that the over-reporting is somewhat evenly spread across religious intensity segments, it has limited impact on the analysis conducted here. Second, across the literature, results obtained with cross-sectional data are often interpreted based on the assumption of a one-directional causal relationship from religiosity to fertility. However, in equations examining the determinants of fertility, religiosity is endogenous and reverse causation remains a

possibility (Berghammer 2012b). Several channels have been suggested to tie past fertility to future religiosity. The "family life-cycle" hypothesis suggests that religious attendance increases after marriage and peaks when the children reach school age (Bahr 1970). The birth of a child increases the need for meaning in life (Berghammer 2012b; Ingersoll-Dayton et al. 2002), which may in turn steer the parents towards religion. Similarly, parents might want to expose their children to positive religious values (Becker and Hofmeister 2001); thereby, they increase their own involvement. It is also possible that pro-family contents of religious teachings and rituals entice individuals with larger families towards a greater involvement (Sander 1992). In addition, the family-oriented services provided by religious groups (Berman et al. 2012) and the community support embedded in religious service attendance (Lim and Putnam 2010; Waite and Lehrer 2003) create additional incentives for households with a greater number of children to increase their religious involvement. Accordingly, a few US studies report empirical evidence that having a child might be followed by an increase in parents' religiosity (Argue et al. 1999; Stolzenberg et al. 1995).

Moreover, the hypothesis of a reverse causation finds support in the literature, which attempts to explain why Western women are generally found more religious than their male counterparts (Edgell et al. 2017; Miller and Stark 2002; Stark 2002; Walter and Davie 1998). Religion reinforces beliefs and attitudes that see females as "keepers of the home" and responsible for domestic work and childrearing (Ammerman and Roof 2014; De Vaus and McAllister 1987; Hertel and Hughes 1987; Sherkat 2000). Therefore, women who by choice or for other reasons are not involved in childrearing may find reduced benefits from religious involvement or be alienated from it (Mikołajczak and Pietrzak 2014; Peek et al. 1991; Stover and Hope 1984). As the above discussion shows, reverse causation may partly explain the patterns emerging from the data analysed here. The cross-sectional structure of the GSS did not allow the examination of the direction of causality. As such, the estimates reported in the next section only reveal partial correlations of the explanatory variables with the outcomes.

5 Results

Tables 4 and 5 investigate the association of religiosity with total fertility, using the GSS of years 1985, 2001 and 2011. As stated in Eq. (1), the dependent variable is the total number of children born to a woman, and a Poisson distribution is assumed. To the benefit of parsimony, all the control variables are suppressed in the tables. The notes to the tables exhaustively list them. The results with the full set of explanatory variables are reported in Online Appendix Tables.

In Table 4, three dummies control for self-identifying as religiously unaffiliated, a Protestant, or affiliated with "Other religions", leaving Roman Catholic as the reference category. The category "Other religions" contains all non-Christian minorities as well as Christian Orthodox groups. As the first column of Table 4 shows, in 1985, the coefficients for the unaffiliated and Protestants are both statistically significant and negative, indicating fertility rates below those of Roman

Table 4 Religious identity and total fertility, 1985–2011

	GSS-1985 (1)	GSS-2001 (3)	GSS-2011 (4)
Reference category: Roman catholics			
Unaffiliated	− 0.296	− 0.261	− 0.109
	(0.106)**	(0.037)**	(0.030)**
Protestant	− 0.178	− 0.087	− 0.051
	(0.039)**	(0.021)**	(0.020)*
Other religions	− 0.101	− 0.129	− 0.106
	(0.056)	(0.064)*	(0.059)
Observations	2413	6266	7274

Robust standard errors in parentheses. Legend: *significant at 5% level; **significant at 1% level. Suppressed controls are: age, age squared, marital status (married/cohabiting, divorced/separated/widowed), university degree, employment status (employee, self-employed), income (low, high), visible minority, province of residence

The data source is the Canadian General Social Survey of 1985, 2001 and 2011

Table 5 Religious attendance and total fertility, 1985–2011

	GSS-1985	GSS-2001	GSS-2011
Reference category: attending services a few times a year			
Never	0.004	0.042	− 0.044
	(0.052)	(0.024)	(0.020)*
Monthly	0.139	0.131	0.107
	(0.049)**	(0.029)**	(0.028)**
Weekly	0.097	0.159	0.113
	(0.040)*	(0.024)**	(0.023)**
Other religions	0.003	− 0.049	− 0.062
	(0.049)	(0.068)	(0.057)
Observations	2413	6266	7274

Robust standard errors in parentheses. Legend: *significant at 5% level; **significant at 1% level. Suppressed controls are: age, age squared, marital status (married/cohabiting, divorced/separated/widowed), university degree, employment status (employee, self-employed), income (low, high), visible minority, province of residence

The data source is the Canadian General Social Survey of 1985, 2001 and 2011

Catholics. More precisely, the expected gap in the log count of children of an unaffiliated woman with her Roman Catholic counterpart is 0.296 (or 1.34 additional children for the Roman Catholic woman), while the difference between a Protestant and a Roman Catholic woman is lower, at 0.178 (or 1.19 additional children for the Roman Catholic woman). These results are net of the influence of characteristics such as age, marital status, education and income.

Column (2) uses the Canadian GSS of 2001. When the GSS-2001 is used, as reported in Column (2), the gap between Roman Catholics and unaffiliated women only slightly shrinks, while the fertility difference between Roman Catholic and Protestant women is reduced to half compared with their gap in 1985. In 2001, the affiliates of "Other religions" are also found to have a lower fertility compared with Roman Catholic women. Finally, the GSS-2011 is analysed and the results are reported in Column (3). Consistent with the pattern detected in 1985 and 2001, the fertility gaps are reduced. Overall, these results indicate a strong fertility convergence between Roman Catholics and Protestants. The remaining difference detected in the 2011 data likely reflects a residual effect of the past fertility gaps. There is a non-negligible fall in the gap between the unaffiliated women and Roman Catholics from 2001 to 2011. It can be interpreted in two ways. First, it may suggest the convergence of fertility rates between the affiliated and the nonreligious. Or, it may indicate that affiliation status has ceased to be an accurate indicator of religious commitment, as reported in certain previous studies (Adsera 2006a; Borooah 2004; Régnier-Loilier and Prioux 2008; Skirbekk et al. 2010; Stonawski et al. 2015). The upcoming more in-depth analysis of the GSS-2011 will shed light on the correct interpretation of this finding.

Table 5 is focused on the association of religious attendance with fertility. Three dichotomous variables are included in the regressions. One dummy takes the value of 1 for those who never attend religious services. Another dummy controls for monthly attendance. The third dummy takes the value of 1 for women who report attending religious services at least once a week. The reference category is comprised of women who report attending religious services a few times a year. In 1985, as shown in Column (1), the coefficients for monthly and weekly attendance are both statistically significant and positive. Although the coefficient for those who attend religious services at least monthly is slightly larger than the coefficient for those who attend weekly, the two coefficients are not statistically significantly different from each other. The results using the GSS-2001 are reported in Column (2). Again, women who attend religious services at least monthly or at least weekly are found to have more children than those with a lower frequency of religious attendance and women who never attend. The expected gap in the log count of children of a woman who attends religious services at least weekly with an otherwise identical woman who attends services only a few times a year or never is at 0.159 (or 1.17 additional children). The coefficient for women who never attend religious services is statistically insignificant for both GSS-1985 and GSS-2001.

Column (3) reports the results of the analysis of the GSS-2011. The only important difference between the GSS-2011 and earlier cycles is that the coefficient for women who report they never attend religious services becomes statistically significant and negative, indicating their fewer children than all other women inclusive of the reference category. More precisely, the regression using GSS-2011 suggests that women who never attend religious services have at least one fewer child than those who attend a few times a year. Their gap with those who attend weekly is rather large, at about 1.7 fewer children.

Table 6 examines how different dimensions of religious commitment currently associate with the number of children, using data from the GSS-2011. The

Table 6 Dimensions of religiosity, GSS-2011

	Age: 40 and older		Age: younger than 40, Intentions	
	Fertility (1)	Childlessness (2)	Fertility (3)	Childlessness (4)
Reference category: Roman Catholics and Protestants				
Importance of religious belief	0.019	− 0.010	0.016	− 0.013
	(0.012)	(0.006)	(0.028)	(0.006)*
Attendance	0.026	− 0.004	0.033	− 0.007
	(0.006)**	(0.003)	(0.018)	(0.004)
Private prayer	0.018	− 0.001	− 0.007	0.001
	(0.007)**	(0.003)	(0.016)	(0.004)
Other religions	− 0.067	0.011	− 0.063	− 0.022
	(0.056)	(0.030)	(0.115)	(0.033)
Observations	7168	7180	2991	2996

Robust standard errors in parentheses. Legend: *significant at 5% level; **significant at 1% level. Suppressed controls are: age, age squared, marital status (married/cohabiting, divorced/separated/widowed), university degree, employment status (employee, self-employed), income (low, high), visible minority, province of residence

The data source is the Canadian General Social Survey of 2011

religiosity indicators considered are importance of religious belief, frequency of religious attendance and frequency of private prayer. Additionally, a dummy controls for affiliation with "Other religions". As such, the equation more directly assesses the effects of commitment to different dimensions of Catholic or Protestant Christianity. Since the religiosity indicators do not have a uniform unit of measurement, the interpretation of the results is limited to the sign and relative magnitude. Columns (1) and (2) focus on women with near completed fertility by restricting the sample to those aged 40 and older.

Columns (3) and (4) use the subsample of women younger than 40. The dependent variables for these regressions are constructed using the two GSS-2011 questions on actual fertility and intentions for having additional children. The dependent variable "intended fertility" examined in Column (3) is the count of children a woman has plus the number of additional children she reported to be willing to have in future. Likewise, the dependent variable in Column (4) is constructed using two GSS questions. It is a dummy taking the value of 1 for women who report having no children at the time of the interview and no intention for future fertility.

As reported in Column (1), when all dimensions of religiosity are simultaneously included in the regression, both religious attendance and private prayer are statistically significant predictors of actual total fertility. The coefficient for religious attendance is somewhat larger. Column (2) examines the likelihood of having remained childless for women aged 40 and older. While all the coefficients are negative, none of them is statistically significantly associated with the outcome.

The right panel of Table 6 focuses on women younger than 40. In Column (3), examining total intended fertility, no coefficient is statistically significant. As Column (4) reports, the importance of religious belief is a statistically significant and negative predictor of childlessness in Canadian women younger than 40.

Table 7 explores the association of secularity with fertility and the likelihood of childlessness, using the three identifiers of nominal affiliate, unchurched believer and strictly secular. Additionally, a dummy controls for affiliation with "Other religions". As such, the coefficients reveal the differences between secular women and women who identify either as Catholic or Protestant. Columns (1) and (2) use the subsample of women aged 40 and older. As Column (1) reports, all these secular women have a statistically significant lower fertility than those affiliated with Roman Catholicism and Protestantism. Among these groups, strictly secular women have the fewest children. The Poisson coefficient reported in Column (1) indicates that on average, strictly secular women have 1.15 fewer children than their actively religious counterparts. In comparison, the gaps among nominal affiliates and unchurched believers with actively religious women are at 1.11 and 1.10 fewer children. Regarding the likelihood of childlessness, the results reported in Column (2) indicate that strictly secular women have a 5.2% higher likelihood of remaining childless closely followed by unchurched believers, at a 4.5% gap. Nominal affiliates do not statistically significantly differ from the actively religious.

The right panel of Table 7 assesses the fertility outcomes of women younger than 40, using the same approach as employed in Table 6 regarding the construction of the dependent variables. In Column (3), no coefficient is found to be statistically

Table 7 Secular groups comparisons, GSS-2011

	Age: 40 and older		Age: younger than 40, Intentions	
	Total fertility (1)	Childlessness (2)	Fertility (3)	Childlessness (4)
Reference category: actively religious Roman Catholics and Protestants				
Nominal affiliate	− 0.106	0.015	− 0.035	0.023
	(0.019)**	(0.010)	(0.047)	(0.013)
Unchurched believer	− 0.099	0.045	− 0.023	0.022
	(0.033)**	(0.016)**	(0.052)	(0.013)
Strictly secular	− 0.141	0.052	− 0.076	0.094
	(0.047)**	(0.024)*	(0.075)	(0.022)**
Other religions	− 0.073	0.017	− 0.062	− 0.021
	(0.057)	(0.026)	(0.115)	(0.020)
Observations	7390	7403	2855	2860

Robust standard errors in parentheses. Legend: *significant at 5% level; **significant at 1% level. Suppressed controls are: age, age squared, marital status (married/cohabiting, divorced/separated/widowed), university degree, employment status (employee, self-employed), income (low, high), visible minority, province of residence

The data source is the Canadian General Social Survey of 2011

significant. However, as shown in Column (4), strictly secular women are statistically significantly more likely to have no children and intend to remain as such. A strictly secular woman younger than 40 is found 9.4% more likely to report an intention for remaining childless than her actively religious counterpart. Although the same outcome of a higher likelihood of childlessness was found for strictly secular women aged 40 and older, the coefficient for strictly secular women younger than 40 is measurably larger (9.4% against 5.2%), indicating a greater tendency towards childlessness among them.

The intended fertility of women younger than 30 and 35 was also examined to assess the sensitivity of the conclusions to the age partitioning. The results only differed regarding the likelihood of intended childlessness, where the coefficient for unchurched believers also became statistically significant, indicating their greater tendency towards childlessness than the women affiliated with Roman Catholicism and Protestantism. The magnitude of the coefficient for unchurched believers, however, remained measurably below that found for strictly secular women (around 5% against above 10% higher likelihood of intending to remain childless). Overall, the results strongly support a qualitative difference between strictly secular and other types of nonreligious women in fertility intentions and outcomes.

6 Discussion and Conclusion

This paper is among the few studies concerned with the association of both religiosity and secularity with fertility outcomes. The data are from the Canadian General Social Surveys, covering cohorts born as early as the 1900s into the 1980s. This study compared Roman Catholics with Protestants and a variety of secularized women. While most previous studies have reduced secularity to either unaffiliation or religious non-attendance, this study considered more subtle differences among those who have limited ties with religion and spirituality. Hence, the present paper is unique in acknowledging the diversity among secularized women. Also scantily done in the previous literature, in assessing the link between religiosity and fertility, multiple dimensions of religious commitment were simultaneously considered.

Several findings are of note. First, Canadian Roman Catholics, who in the early twentieth century much like elsewhere in the Christian world, had higher fertilities than Protestants and no longer substantially differ from Canadian Protestants in their fertility outcomes. Second, among various dimensions of religiosity, religious attendance appears to be the stronger predictor of fertility compared with religious belonging and private prayer. This finding aligns the Canadian pattern with that found for other Western countries. Finally, when nonreligious women are differentiated based on their stance towards religion, strictly secular women were found to have the lowest fertility. Although the belief or non-belief in deities has not been explicitly surveyed in the data, the stance of those identified as strictly secular seem to closely reflect the worldview of the atheists. The results indicate that women who are proxy-identified as atheists qualitatively differ from other types of secularized women. The analysis also indicated that nominal affiliates, i.e. affiliated women who show no engagement with their faith, do not substantially differ from

women who have retained some personal ties with religion or spirituality without formally identifying with organized religion. While not very different from each other, these two groups of secularized women were also shown to have lower fertilities than the actively religious. The examination of the fertility intentions of younger women produced comparable patterns. Overall, the results provide a strong support for the premise that religiosity (or lack thereof) continues to be a determinant of fertility behaviour in Canada.

The assessment of the interaction between religiosity and fertility is important. The understanding of how religiosity mediates fertility allows for more accurate projections about the future religiosity trends (Hackett et al. 2012, 2015; Kaufmann et al. 2012; Voas 2003). Secularization theorists generally argue that religiosity declines as countries economically progress (Bruce 2002; Davie 2007; Dobbelaere 2000; Greeley 2002; Hout and Greeley 1987; Martin 1978, 2005; Smith 2008). Norris and Inglehart (2004) link religious decline to educational attainment and income, which alleviate individual fears of insecurity. Conversely, religious markets' scholars emphasize the supply-side factors and explain the European secularization by the lack of competition in these countries compared with the USA (Grim and Finke 2007; Stark and Iannaccone 1994). Yet, from both sides of the secularization debate, scholars acknowledge that demographic factors favour the religious over the nonreligious in relative population growth (Hout 2003; Hackett et al. 2012, 2015; Kaufmann 2010; Kaufmann et al. 2012; Stark 1996; Stonawski et al. 2015).

The historical effects of fertility differentials on the growth of religious groups have been well documented. Stark (1996) shows that favourable fertility and mortality rates of early Christians compared with Hellenistic pagans helped fuel the later dominance of Christianity in the Roman Empire. The favourable demographic trends among Christians of the Roman Empire gave rise to a population increase from 40 converts in 30 A.D. to 6 million by the year 300 A.D. (Stark 1996). In the contemporary Western world, current religiosity is highly correlated with that of the previous generation (Hout 2003; Sherkat 2000; Voas 2003). According to Hout (2003), the combination of differing fertility rates and the greater intergenerational transmission of religious views among the devout would be sufficient to reverse the secularization trends in some countries.

In the USA, where religious switching is more common than elsewhere in the Western world (Scheitle et al. 2011; Sherkat 2001), substantial evidence has been created regarding the strong influence of fertility, as well as immigration, on the relative size of the religious groups (Hout et al. 2001; Sherkat 2001). Sherkat (2001) reports that gains from Hispanic Catholic immigration and the higher fertility of these immigrants have helped offset large net Catholic losses to other denominations and unaffiliation. Once a negligible minority, Mormons currently surpass American Jews in number, due to their fertility advantage (Sherkat 2001). The same holds true for all conservative Protestant denominations, where the larger part of their higher growth rate compared with their liberal counterparts is due to fertility advantage rather than conversion (Hout et al. 2001; Kaufmann et al. 2012; Sherkat 2001).

According to Kaufmann (2010), the two factors of religious fertility and religious immigration will likely redefine the secularization trends in the West. Across European countries, more religious women are found to have significantly higher fertilities than their secular counterparts (Surkyn and Lesthaeghe 2004). In parallel, the greater religiosity of immigrants (Adsera and Ferrer 2016; van Tubergen 2006, 2007) and their higher fertility rates are likely to intensify the fertility advantage of the religious, and to ultimately reduce the spread of secular views (Barrett et al. 2000; Johnson and Grim 2013; Kaufmann 2010; Skirbekk et al. 2010). Using more than 2500 data sources from 198 countries, Hackett et al. (2015) project the future size of religiously affiliated and unaffiliated populations worldwide. They find that the total fertility of religiously affiliated women is globally almost a full child higher than the rate for the unaffiliated. This greater fertility, Hackett et al. (2015) show, more than offsets the effects of religious disaffiliation, leading to a substantial decline in the population share of the seculars worldwide, by 2050. Focusing on Western Europe, Kaufmann et al. (2012) construct a model in which the projections not only consider affiliation status but also the degree of religiosity. Kaufmann et al. (2012) argue that religious intensity, measured in terms of attendance or self-reported belief, matters more for fertility than religious affiliation, since practising affiliates generally have notably higher fertilities than non-practising affiliates (Adsera 2006a; Régnier-Loilier and Prioux 2008; Skirbekk et al. 2010; Stonawski et al. 2015). With these additional considerations, Kaufmann et al. (2012) conclude that Western Europe may be more religious at the end of the twenty-first century than at its beginning.

The present study took note of this strand of the literature, by considering both the affiliation status and the degree of commitment to various dimensions of religiosity. Additionally, in the examination of the association between secularity and fertility, nominal affiliates were separated from the unaffiliated and the actively religious. The results set Canada in line with Western European countries (Adsera 2006a; Kaufmann et al. 2012; Stonawski et al. 2015). In Canada, nominal affiliation predicts a fertility level below that of the actively religious. Additionally, this study established that among secularized women, those strictly committed to their nonreligious worldviews have notably lower fertilities than secular women who are less committed to their secularity. As the differences in fertility were non-negligible and remained consistently present among the younger cohorts, they are expected to impact the spread of secularization in the country. The greater tendency of strictly secular women towards childlessness appears likely to hamper the strong trends of religious decline, observed in Canada during the past few decades (Dilmaghani 2017a, b; Eagle 2011; Wilkins-Laflamme 2015).

Although not examined in this paper, immigrants to Canada differ from the Canadian-born in both their religiosity and their fertility behaviour (Adsera and Ferrer 2016; Dilmaghani 2017c, d). With the greater intergenerational transmission of religious values among the highly devout and their higher fertilities, it seems plausible to expect that the size of the highly religious remains stable in Canada, in the decades to come. Conversely, the sharp trends of religious decline in the country (Dilmaghani 2017a; Eagle 2011; Wilkins-Laflamme 2015) are likely to be hindered by the lower fertility rates prevailing among the seculars. Hence, stabilization in

size, rather than a continuous growth, is also possible for the secular groups. The combination of these two factors will perhaps intensify the emerging polarization of the Canadian religious landscape (Bibby 2011; Reimer 2017; Wilkins-Laflamme 2014, 2016, 2017). The concept of religious polarization is one of the newest developments in the scientific study of religion in Western countries (Achterberg et al. 2009; Kaufmann et al. 2012; Ribberink et al. 2013; Wilkins-Laflamme 2014). The examination of the effects of the differences in fertility rates by the degree of both religiosity and secularity, rather than the affiliation status alone, on the emergence of a religiously polarized landscape appears to be a meaningful future contribution to the field.

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