The Role of Secularization on Marriage and Conception Seasonality Patterns: A Study of Antwerp (Flanders, Belgium) in the Second Half of the Nineteenth and the Early Twentieth Century

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Abstract

The period comprising the second half of the nineteenth and the early twentieth century in Belgium has been described as one of rapid societal transformation including industrialization, urbanization, and, also in some extent, secularization. This is the historical period in which first mortality and later fertility also declined, facilitated by socio-economic (structural) and cultural changes, and resulting in the first demographic transition. One of the characteristics of the secularization marking this period is considered to be the reduced compliance with religious rules concerning the timing of marriages and sexual intercourse (i.e., conceptions). Against this background, the purpose of this article is twofold. It first assesses the initial extent and evolution of church control in the rapidly developing port city of Antwerp, Flanders (Belgium), in the mid-nineteenth and early twentieth centuries. This will be studied through a so-called daily Lent and Advent marriage and conception index. By daily, we mean that we exactly measure the timing of Advent and Lent. We secondly try to explain the determinants of the occurrence of these marriages and conceptions through individual socio-economic, cultural, and life-course factors. We use data from the unique multisource COR* historical sample, containing individual information from population registers and civil registration records (1845–1913). We find clear signs of decreasing compliance with religious rules and therefore secularization but different patterns for marriages and conceptions. Even though compliance overall decreases for both events, rules are better complied with for marriages, and in particular, first marriages. Marriages are more influenced by social control than for sexual intercourse (i.e., conceptions). The influence of stronger compliance with marriage seasonality is observed through better adherence with first conceptions, although this is in much less extent for higher-order conceptions. The occurrence of these events, in particular marriages, is determined by

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a number of structural, cultural, and life-course factors. Noncompliances are found more in an urban setting, older women, and later historical periods, whereas compliance is found in high social class of men. For conceptions, relatively few (significant) effects are observed, although noncompliance for maternal literacy status and compliance for paternal social class is also found indicating gender differential effects.

Keywords

secularization, Advent, Lent, seasonality, marriage, conception, multisource historical sample

Background

The period comprising the second half of the nineteenth and the early twentieth century has been described as one of rapid societal transformation for Belgium, its northern Dutch-speaking region Flanders, and its main port city of Antwerp. This was a period marked by industrialization, that is, a shift from an economy based predominantly on agriculture to a more industrial one. From an economy based on agriculture and textiles, Antwerp developed, in a rather short time span, into a large port city, with port-based economic sectors expanding spatially. As a result of this socio-economic development, Antwerp attracted large numbers of immigrants originating mostly from neighboring provinces and countries.¹ Such developments prompted rapid urbanization.

This period has also been described as one of secularization.² Secularization has been defined as the breakdown of religious authority and decreased adherence to religious practices.³ As a result of modernization, religious institutions and values declined in significance. In Belgium, secularization started in the early to mid-nineteenth century in Wallonia (French-speaking region) and especially the industrial belt surrounding Liège. In the second half of the nineteenth century, it spread to urban areas (like the axe Brussels-Antwerp) in Flanders. In Belgium, secularization was driven by an anti-clerical bourgeoisie that rejected church authority. Three historical movements pushed secularization forward throughout the nineteenth century: the growth of the liberal party and freemasonry, the growth of socialism and the socialist party (though losing its revolutionary aspect), and the loss of the functions of organized religion.⁴ Secularization in Belgium was affected by different factors, including industrialization, whereas pillarization started to counteract responding to upheavals of socio-economic and cultural changes through the development of political and social institutions.⁵

Secularization is a multidimensional concept comprising changes on at least three levels: societal, organizational, and individual. Societal secularization concerns a functional differentiation process resulting into a process of specialization of subsystems. Organizational secularization comprises the changes concerning the religious institution itself, including churches and religious denominations. Individual secularization concerns individual behavior and measures the degree of normative integration into the respective religious bodies.⁶ Our interest in this article is in this third, individual level. Where secularization touches upon individual behavior, it often means reduced compliance with religious rules. It has often been measured through a number of different indicators including the proportion of the population complying with Easter duties, with attending mass on Sunday, with being buried according to Catholic rules, and so on.⁷

Some religious rules had a direct impact on demographic behavior. These included, for instance, the cultural allowance or preference not to marry and not to conceive in certain periods of the year, especially the periods of Lent and Advent. Lent begins on Ash Wednesday and comprises the forty days (not counting Sundays) before Easter. Advent starts four Sundays before Christmas day, on the Sunday closest to St. Andrew's Day (i.e., November 30). Lent is a period to fast and to refrain from celebration and luxury, while Advent is a period to prepare for Christmas. Marriage⁸ and reproductive activities⁹ were discouraged in those periods based on religious vows pertaining to conducts,

practices, and views. While both Lent and Advent are important, Lent is the more important one given the Lenten vows¹⁰ and its superstitious beliefs and therefore is enforced more strongly than Advent.¹¹ The above raises the possibility of secularization at the time of the demographic transition reflected in changing marriage and conception seasonality patterns. In periods of compliance with religious rules, both periods should be marked by troughs corresponding to Advent and Lent. In periods of secularization, these troughs should slow down.

While both marriage and sexual intercourse were banned in the Lent and Advent periods, both events are very different in nature. Marriage is a public event, it includes family and church approvals, a preceding public announcement, a public civil event and a public church event involving the commune, the family, and the wider community.¹² In that sense, marriage is expected to be guided more by the expectations of other members of society than by true private beliefs. Sexual intercourse, on the other hand, is a private event and therefore more likely to be based on private beliefs. Sexual intercourse is socially invisible and therefore beyond religious control, providing more room for individuals to act based on their own wish. Evidence shows that parity-specific fertility control was not always in line with church principles but was practiced by subgroups of population. This was observed before and during the first demographic transition through birth spacing behavior,¹³ birth stopping,¹⁴ as well as sexual abstinence and coital interruptus.¹⁵ This is why the breakdown of religious authority and the decrease in religious adherence have been linked to fertility decline.¹⁶ In this sense, the study of marriage and conception can shed a different light on the nature of secularization in Antwerp, Flanders, Belgium, in the second half of the nineteenth and the early twentieth century.

Societal change, like secularization, is not a uniform process. Changes in the extent of compliance with religious rules are mediated through different factors. They depend on the degree to which compliance with religious rules is consistent with other aspects of life. For example, it will be easier to comply with fasting requirements in periods of the year where agricultural work is less demanding outside the activities of soil preparation and seeding in spring and harvesting in autumn.¹⁷ The church can also monitor behavior more closely in small-scale communities. On the other hand, fasting may be more complicated when individuals are subjected to the structural time schedule of modern industrial factories. Also, the church can less easily monitor behavior in diverse, large-scale communities. It is for this reason that seasonality of behavior is influenced by population characteristics that can differ by religiosity, ethnicities, and geographical locations.¹⁸ These attributes of socio-economic and cultural characteristics concern social class, place of origin, income, legitimacy of births, location of residence (rural/urban), and types of economic activities.

Against this background, this article aims to study secularization through two key indicators: marriage and sexual intercourse (i.e., conception) seasonality. We examine whether these behaviors are influenced by individual socio-economic, cultural, and life-course characteristics. And finally, we present the explanatory power of the “daily Lent and Advent” (DLA) marriage and conception index as a proxy of secularization (see Method section).

Previous Methodological Approach

Generally speaking, the seasonality of demographic behavior in historical demographic research is studied more for marriages than for births. Ample studies on marriage seasonality before the twentieth century exist, focusing on effects of agricultural cycle and/or industrialization on the timing of marriages. These include the ones in England in 1650–1799,¹⁹ in Southern Sweden in 1690–1895,²⁰ and in the Netherlands in 1810–1940.²¹ The measures used on marriage seasonality in these studies are based on seasons (spring and autumn) or monthly (March and December). These studies examine the importance of the changing workload, a proxy for mode of production during the year, that can determine the timing of marriages.

In contrast to these international studies, three studies based on Belgian historical demographic data in nineteenth to early twentieth century are highly important in our research design since it examines the cultural effects on seasonality specifically. To begin with, Lesthaeghe and Lopez²² have measured the first secularization wave through the degree of nonobservance/compliance of the marriage ban during Lent and Advent (MLA). This index is calculated on the basis of percentage of marriages in the month of March and December, an approximation of Lent and Advent, which then is divided by 2/12, the proportion that would be observed without marriage seasonality, the so-called the degree of nonobservance of the MLA index. This conventional MLA index is 100 if no marriage ban is being observed, and when lower value 100 will indicate the noncompliance of church rules. They have calculated MLA indexes for all Belgian provinces starting from 1841 to late nineteenth century and concluded that the impact of (first) secularization was pronounced for French-speaking (Walloon) *arrondissement* in comparison to the Dutch-speaking (Flemish) ones, except for the larger towns of Antwerp and Ghent in the Dutch-speaking provinces. These findings imply that the first wave of secularization is closely associated with industrial and urban *arrondissements*. The second relevant study in Belgium is based on the study of Matthijs and Van de Putte²³ examining the marriage seasonality in nineteenth century in the Flemish municipalities of Leuven, Aalst, and Bierbeek. Their work builds on to previous work of Lesthaeghe,²⁴ while specifying the period of Lent at the daily level per year. The novelty of their work is the use of relatively well-recoded occupation codes allowing to examine the effects of social class through logistic regression techniques. They have found that occurrence of marriages during Lent was observed in the case of remarriages and legitimization of child. The former reason indicates that these occurrences occur among older age-group, while the latter one among the younger age-group. The differences of marriage seasonality across municipalities are also observed, owing to the type of the economic sector individuals are engaged in. Geographical location influences the marriage seasonality as well: higher chances of marriage seasonality are associated with the dominant service sector in Leuven rather than agriculture-based small village in Bierbeek and/or small provincial city in Aalst. Thirdly, the recent study of Ruggeri examines marriage seasonality on the basis of civil marriage records from seventeenth- to eighteenth-century West Flanders province on the basis of marriage index of Lent and Advent calculated at the daily level per year.²⁵ She identifies the importance of agricultural patterns and geographical location on marriage seasonality. Noncompliance of church rules in Advent period is identified for this study period where agriculture workloads are rather absent compared to Lent period, despite of the expected strong dominance of church rules in this region.

Research Framework and General Hypotheses

The aforementioned international and national studies are the basis of our research design by highlighting three additional characteristics. In the first place, our analysis extends previous empirical research by calculating Advent and Lent index separately, by specifying the variable period per year. This results in the calculation of daily Advent and Lent indexes, respectively. Secondly, our study focuses on the Antwerp *arrondissement* where a first wave of secularization was already observed during the nineteenth century.²⁶ Our analysis includes socio-economic and cultural variables to study individual effects on the interplay between industrialization and secularization. Thirdly, our study presents both marriage and births (conceptions) seasonality and its socio-economic and cultural determinants.

We make use of an overall framework for the analysis of individual behavior. The behavioral outcome concerns the timing of marriages and conceptions. For the purpose of understanding the timing of behavior, the life-course perspective is useful. Four basic concepts—"human agency," "location in time and place," "timing," and "linked lives"—are important, the first three being more important than the fourth.²⁷ For the purpose of analyzing explanatory factors of behavior, the second objective of this article, structural and cultural theories of marriage and fertility behavior are used.²⁸ This article aims to answer two research questions.

Research Question 1: Can any changes be observed in the overall seasonality of marriage and conception—and in particular, in the relative incidence of marriages and conceptions in the periods of Advent and Lent—in Antwerp in the second half of the nineteenth century and the early twentieth century (1845–1913)? (RQ1.1) Do these trends differ by event (marriage or conception) (RQ1.2), by event order (RQ1.3), and by type of seasonal event (Advent/Lent) (RQ1.4)?

Hypothesis 1: We expect the relative incidence of marriages and conceptions in the periods of Advent and Lent to increase from the late nineteenth century onward since great social change took place in Antwerp in this period.²⁹ In general terms, people start complying less with religious rules (H1.1). We assume that religious rules are less followed for sexual intercourse (i.e., conceptions) than for marriages (H1.2), for higher-order events than for first-order events (H1.3), and for the less important period of Advent than for the more important period of Lent (H1.4). We consider that public marriages, first-order events, and the more important period of Lent are likely to be subject to greater degrees of social control than private sexual behavior, higher-order events, and the less important period of Advent.

Research Question 2: Can the likelihood of the occurrence of marriage and sexual behavior (i.e., conception) during Lent and Advent be explained by individual characteristics?

Hypothesis 2: We expect that the occurrence of both events is influenced by individual-level socio-economic, cultural, and life-course factors and historical time. The occurrences of these events are highly effected by the higher socio-economic status and place of birth (i.e., non-Antwerp origin) of individuals, and the higher effects in urban and suburban areas.

Data, Method, and Measures

Data

The multisource COR* historical sample for the Antwerp (Flanders, Belgium) arrondissement is used for the analysis.³⁰ This sample comprises individual information from population registers and vital registration records of births, marriages, and deaths, and household and geographical information for the period 1845–1920 ($N = 33,583$). A subsample is used as this analysis focuses only on marriages and conceptions/births. Individuals are linked to each other (e.g., children linked to parents) through a unique identifier in the COR* sample (released in 2010). Our sample focuses on the period from 1845 until 1913, taking account data quality issues, and ending just before the First World War (1914–1918).³¹ As a result, a total of 4,584 marriages and 7,796 birth records are analyzed.

Method

One key measure used in this article is the marriage and conception index. This index compares the actual number of marriages and conceptions in a certain time period (i.e., Advent and Lent) with the one that would be expected for that period in the event of no marriage and conception seasonality. This means there are equal proportions of marriages and conceptions throughout the year. This index is calculated in three steps. In a first step, event dates are obtained. Marriage dates are obtained from civil registration records and population registers. We acknowledge that civil marriage registration dates may sometimes differ slightly from religious marriage registration dates in church registers. Estimated conception dates are obtained by subtracting 270 days from the actual timing of birth recorded in the source. In a second step, the expected event incidence is calculated. This is the number of marriages and the number of conceptions that would take place in Lent and Advent if there was no marriage and conception seasonality. For marriages, for instance, this would be calculated as follows: for Lent and

Advent, respectively: $[(\text{total number of marriages for the whole year}) \times (46/365)]$ and $[(\text{total number of marriages for the whole year}) \times (28/365)]$. In a third step, the actual event incidence (i.e., actual number of marriages and conceptions taking place in Lent and Advent, respectively) is divided by the expected event incidence to obtain an index. The further below 1 the index is, the stronger the seasonality, and therefore the stronger the compliance with religious rules.

Simplified marriage indexes calculated on the basis of standard 1 (Advent: December) and 2 (Lent: March) month periods have been used.³² However, each year, the date of Easter changes and so is the Ash Wednesday and Advent Sunday (i.e., the Sunday nearest to St. Andrew's Day [November 30]). The indexes used in this article have been calculated on the basis of the exact dates of these respective events. So the originality in this article lies in a more detailed calculation of the index as well as extending the index from marriage to conception.

In the second part of the analysis, dichotomous logistic regression models, on the basis of individual units, are used to identify determinants of the occurrence of marriage and conception during Advent and Lent. The probability of events will be examined controlled for individual attributes. For the preparation of data files and all statistical analysis, the programme SAS (Version 9.4) is used, and specifically *Proc Logistic*.

Measures

Dependent variable: marriage and conception seasonality. First, the precise timing (day, month, and year) of each event (marriage and conception) is obtained. As for conceptions, information is considered for all births, subject to the correct timing (1845–1913) and location (Antwerp arrondissement), regardless of survival status (so also still births and infant deaths), and this in order to maximize the number of sample units. Missing dates are removed from the analysis. We acknowledge that this measure is rather arbitrary since conception behavior is the process outcome of deliberate fertility control (e.g., coital interruptus and also abortion) and other consequences such as malnutrition-induced subfecundity, amenorrhea due to long breast-feeding practices,³³ coital frequencies, and maternal age.³⁴ Then, it is determined for each event whether it takes place in Lent and/or Advent. For the model exploring the determinants of marriage and conception taking place in Advent or Lent, a dichotomous outcome variable is constructed (e.g., occurred in Advent/Lent is coded 1 and all others are coded 0).

Independent variables on socio-economic, cultural, and life-course variables. The measures described below are relevant for the research question concerning the individual socio-economic, cultural, and life-course characteristics determining the timing of events. Building on previous analyses,³⁵ we select the following measures.

Structural/economic factors. Referring to location in time and place life-course concepts, three variables in the socio-economic field are operationalized: place of birth of mother and father, place of location of event, and socio-economic class. Place of birth is classified into the following six categories: (1) Antwerp province origin, (2) Brussels, (3) other provinces in Flanders, (4) provinces in Wallonia, (5) foreign country, and (6) missing. Place of location of event is classified into the following four categories: (1) urban, (2) suburban, (3) rural, and (4) missing. Socio-economic class is classified into the following four categories: (1) low, (2) medium, (3) high, and (4) missing. Following a classification scheme (e.g., Historical International Social Class Scheme³⁶), farmers are identified as a low social-class group in this analysis. We consider this category is optimal in this context given the fact that majority of farmers in Antwerp are not engaged in large holdings. Farmers are also in general subject to changing labor load over the year, although since this proportion is rather minor in the Antwerp sample, we consider that this effect is minor.

Figure 1. Daily Lent and Advent index for all marriages and all conceptions, 1850–1913.

Cultural factors. Three variables in the cultural field are operationalized. First, the extent of secularization is captured through the extent to which the religious calendar (and in particular the “closed” periods in Advent and Lent) has been observed at the time of marriage.³⁷ This variable concerns for the model on conception. Another cultural factor concerns the literacy status through presences of signature of mother and father for both events, but also the marital status for conceptions, a proxy of secularization since premarital conceptions are against clerical regulations. Literacy status is a proxy variable for educational status as no compulsory and formal school existed in this period. As far as the coding is concerned, the timing of marriage in relation to religiously closed periods is classified into three categories: (1) no event, (2) event occurred, and (3) missing. The same three-level categorization is applied to father’s and mother’s literacy status: (1) illiterate, (2) literate, and (3) missing, and also for marital status at the time of conception: (1) married, (2) not married, and (3) missing.

Life-course factors. The four basic concepts of life course will be studied through maternal age at the time of the event (“human agency” and timing), order (timing), and historical period (location in time and place). Maternal age at the time of the event was classified into the following eight age groups: (1) <20, (2) 20–24, (3) 25–29, (4) 30–34, (5) 35–39, (6) 40–44, (7) 45–49, and (8) missing. Order and parities are categorical variables. Historical period was classified into seven decades of 1844/1845–1913.

Results

Descriptive Statistics

Descriptive statistics for the indexes are shown in Figure 1 for marriages and conceptions, Figure 2a–c for marriages, and Figure 3a–c for conceptions, covering the period of 1844/1845–1913. The X-axis shows the year of the event. The Y-axis shows the index values. These figures include both observed values and trend lines.

Figure 2. (a) Daily Lent and Advent index for marriages by order, 1850–1913; (b) daily Lent and/or Advent index within first marriages, 1850–1913; and (c) daily Lent and/or Advent index within remarriages, 1850–1913.

Figure 3. (a) Daily Lent and Advent index for conceptions by order, 1850–1913; (b) daily Lent and/or Advent index within first conceptions, 1850–1913; and (c) daily Lent and/or Advent index within high order (2+) conceptions, 1850–1913.

There are three broad observations. In the first place, Figure 1 shows that the index for all (Lent + Advent) marriages increases rather steadily from the middle of the nineteenth century to the late nineteenth century, remaining at a higher level thereafter. There is some limited decline at the beginning of the twentieth century though. This small decline in this period may indicate that secularization did not progress further in Antwerp. The same figure shows that the index for all (Lent + Advent) conceptions is generally higher than that for marriages. Although it fluctuates to a substantial extent, an overall increase can be generally observed at the beginning of the twentieth century.

Then focusing specifically on marriages, Figure 2a shows a more rapid increase in the index for all (Lent + Advent) remarriages than for all (Lent + Advent) first marriages. The index for remarriages is also generally higher than for first marriages. Figure 2b shows an important difference in terms of the index for first marriages between Lent and Advent. These index values are consistently substantially lower for Lent than for Advent. Figure 2c shows differences in terms of the index for remarriages between Lent and Advent.

Turning to conceptions, Figure 3a shows a substantial increase in the index for all (Lent + Advent) first conceptions around the middle of the nineteenth century. This is followed by a less substantial decrease thereafter and a rapid increase at the beginning of the twentieth century. For second- and higher-order conceptions, the index is already substantially higher at the beginning of the period, with some fluctuation thereafter. Figure 3b shows an important difference in terms of the index for first conceptions between Lent and Advent. Unexpectedly, the index values are substantially lower for Advent than for Lent. Figure 3c shows a difference in terms of the index for second- and higher-order conceptions between Lent and Advent. Here, the index values are substantially lower for Advent than for Lent.

Multivariate Analysis

We now shift our attention to the determinants of the occurrence of marriages and conceptions in Lent and Advent. Results of logistic regression models of marriage and conceptions, as well as its order, are shown in Tables 1 and 2, respectively. Table 1 shows that the likelihood of marriage taking place in Lent or Advent increases substantially in an urban setting (odds ratio [ORs]: 2.850), for women marrying late (age 45+; ORs: 3.965), and in later historical periods (ORs: 2.605 [1885–94]/2.361 [1895–1904]/2.038 [1905–1913]). On the other hand, the likelihood decreases substantially when men come from a higher social class (ORs: 0.365). When distinguishing by the order of event, no important differences from these general results are observed, except that the decreased effect of men's social class disappears, but the decreased effect of the men's literate status appears in remarriages (ORs: 0.439).

Table 2 shows that the likelihood of conception taking place in Lent or Advent increases somewhat for literate mothers (ORs: 1.054), whereas it decreases somewhat in the later historical period (1905–1913; ORs: 0.936). The increasing effect of maternal literacy holds for first conceptions. The likelihood of such conceptions also increases in the period 1865–1874 (ORs: 2.963) but decreases substantially when the father has a higher social status (ORs: 0.358). For higher-order conceptions, the effect of maternal literacy disappears.

Table 3 then specifies the conception sample (Table 2) by stratifying the sample beyond 1865, the period of first demographic transition. The reference period in the model is 1865–1874 where the conceptions during the closed period substantially increases in comparison to 1844–54 as shown in Table 2. It is interesting to note that conceptions in 1905–13 decreases for all conceptions (ORs: 0.751), whereas first-order conceptions also decrease in 1875–74 (ORs: 0.490), but high-order ones increase in 1885–94 (ORs: 1.122). Among first conceptions, father's birth origin in French-speaking part (Wallonia province) substantially increases this likelihood (ORs: 3.068), while for maternal literacy slightly decreases it (ORs: 0.987).

Table 1. Marriages in Advent and Lent Time and Effects of Socio-economic, Cultural, and Life-course Characteristics.

All/Historical Periods	All		First		Second+	
	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)
Intercept	0.158	.564 (.001)**	0.151	.589 (.001)**	0.121	.776 (.007)**
Location						
Rural (ref)						
Suburban	1.850	.192 (.415)	1.302	.214 (.989)	5.097	.414 (.143)
Urban	2.850	.166 (.0004)***	2.205	.184 (.004)**	5.169	.356 (.081) ²
Women's place of birth						
Antwerp (ref)						
Brussels	1.493	.274 (.546)	1.838	.276 (.249)	0.374	1.382 (.491)
Other Flemish provinces	1.228	.138 (.827)	1.248	.145 (.631)	1.175	.636 (.761)
Wallonia provinces	1.319	.229 (.858)	1.344	.246 (.986)	1.939	.802 (.387)
Foreign countries	1.279	.173 (.952)	1.362	.180 (.920)	0.949	.747 (.979)
Men's place of birth						
Antwerp (ref)						
Brussels	1.251	.486 (.653)	1.619	.549 (.445)	1.353	.902 (.983)
Other Flemish provinces	1.074	.261 (.802)	1.130	.286 (.835)	1.212	.489 (.791)
Wallonia provinces	1.029	.426 (.957)	0.994	.467 (.884)	1.366	.940 (.991)
Foreign countries	0.834	.341 (.583)	0.809	.374 (.464)	1.241	.722 (.883)
Women's social class						
Low (ref)						
Medium	1.757	.528 (.752)	1.839	.548 (.685)	0.928	.410 (.885)
High	2.115	1.503 (.815)	1.819	1.551 (.891)	NA	
Men's social class						
Low (ref)						
Medium	0.871	.167 (.221)	0.929	.174 (.222)	0.467	.481 (.592)
High	0.365	.369 (.072) ²	0.440	.374 (.154)	0.213	1.085 (.335)
Women's literate status						
Nonliterate (ref)						
Literate	0.824	.173 (.803)	0.778	.292 (.210)	1.082	.344 (.437)
Men's literate status						
Nonliterate (ref)						
Literate	0.864	.306 (.220)	1.336	.161 (.368)	0.439	.214 (.055) ²

(continued)

Table 1. (continued)

All/Historical Periods	All		First		Second+	
	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)
Age-group						
<20						
20–24 (ref)						
25–29	1.784	.143 (.344)	1.688	.150 (.753)	5.605	.572 (.093) ^λ
30–34	0.970	.106 (<.0001) ^{***}	0.954	.115 (<.0001) ^{***}	1.372	.310 (.148)
35–39	1.297	.132 (.163)	1.234	.146 (.068) ^λ	1.999	.329 (.828)
40–45	1.606	.169 (.857)	1.500	.197 (.719)	2.437	.350 (.718)
45–49	1.455	.189 (.717)	1.310	.230 (.370)	2.227	.352 (.917)
Order	3.965	.251 (.0002) ^{**}	5.322	.303 (<.0001) ^{***}	3.621	.472 (.268)
First (ref)						
Remarriage	1.141	.081 (.413)	NA		NA	
Period						
1845–1854 (ref)						
1855–1864	1.016	.250 (.063) ^λ	0.772	.309 (.037) [*]	2.480	.442 (.781)
1865–1874	1.189	.186 (.099) ^λ	1.076	.207 (.130)	1.737	.422 (.581)
1875–1884	1.904	.142 (.247)	1.814	.156 (.178)	2.285	.351 (.908)
1885–1894	2.605	.114 (<.0001) ^{***}	2.310	.126 (.0003) ^{**}	4.291	.291 (.021) [*]
1895–1904	2.361	.109 (.0005) ^{**}	2.273	.119 (.0003) ^{**}	2.134	.308 (.929)
1905–1913	2.038	.115 (.043) [*]	1.886	.126 (.049) [*]	2.709	.301 (.483)
N	4,584		4,074		510	
R ²	0.022		0.023		0.061	

Note: Categories for missing items are included in all models but are not included in the table.

*p < .05.
**p < .01.
***p < .0001.
λ p < .1.

Table 2. Conceptions in Advent and Lent Time and Effects of Socio-economic, Cultural, and Life-course Characteristics.

All/historical periods	All			First			Second+		
	Odds Ratio	SE (p Value)		Odds Ratio	SE (p Value)		Odds Ratio	SE (p Value)	
Intercept	0.167	.201 (<.0001)***		0.138	.375 (<.0001)**		0.205	.241 (<.0001)	
Location									
Rural (ref)									
Suburban	1.136	.050 (.332)		1.203	.098 (.378)		1.116	.058 (.478)	
Urban	1.117	.045 (.491)		1.116	.087 (.894)		1.102	.053 (.600)	
Mother's place of birth									
Antwerp (ref)									
Brussels	1.113	.275 (.809)		0.811	.458 (.893)		1.453	.341 (.556)	
Other Flemish provinces	0.943	.132 (.451)		0.898	.232 (.858)		0.950	.162 (.166)	
Wallonia provinces	0.919	.247 (.613)		0.886	.425 (.948)		0.973	.301 (.507)	
Foreign countries	0.999	.170 (.806)		0.891	.291 (.909)		1.063	.210 (.595)	
Father's place of birth									
Antwerp (ref)									
Brussels	1.401	.459 (.708)		0.975	.803 (.724)		1.964	.553 (.378)	
Other Flemish provinces	0.948	.178 (.222)		0.901	.341 (.288)		1.001	.212 (.377)	
Wallonia provinces	1.572	.301 (.340)		2.835	.504 (.120)		1.246	.379 (.933)	
Foreign countries	1.174	.212 (.979)		1.357	.409 (.908)		1.180	.249 (.927)	
Mother's social class									
Low (ref)									
Medium	1.078	.099 (.607)		1.165	.196 (.903)		1.065	.115 (.625)	
High	NA								
Father's social class									
Low (ref)									
Medium	0.906	.089 (.424)		0.851	.193 (.561)		0.919	.100 (.567)	
High	0.637	.184 (.124)		0.358	.437 (.085) ^λ		0.753	.201 (.481)	
Marriage seasonality									
None (ref)									
Closed period	0.990	.069 (.940)		1.443	.127 (.149)		0.855	.083 (.345)	
Mother's literate status									
Nonliterate (ref)									
Literate	1.054	.107 (.042)*		1.027	.252 (.079) ^λ		1.049	.118 (.192)	
Father's literate status									
Nonliterate (ref)									
Literate	0.988	.162 (.438)		0.951	.354 (.649)		1.007	.182 (.541)	

(continued)

Table 2. (continued)

All/historical periods	All		First		Second+	
	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)
Marital status						
Married (ref)						
Unmarried	0.926	.072 (.688)	1.044	.114 (.549)	0.940	.096 (.752)
Age-group						
<20	0.980	.154 (.822)	0.913	.237 (.449)	1.061	.216 (.586)
20–24 (ref)						
25–29	0.976	.114 (.790)	1.174	.207 (.728)	0.928	.141 (.911)
30–34	1.042	.117 (.414)	1.291	.224 (.456)	0.981	.142 (.783)
35–40	0.994	.125 (.701)	1.366	.266 (.400)	0.946	.149 (.983)
40–44	0.937	.149 (.943)	0.973	.339 (.733)	0.930	.173 (.936)
45+	1.100	.312 (.630)	1.059	.807 (.969)	1.246	.339 (.411)
Parity			NA			
First (ref)						
Second	1.049	.066 (.472)				
Third	0.970	.075 (.678)			0.928	.072 (.637)
Fourth	0.986	.084 (.864)			0.950	.080 (.885)
Fifth+	0.998	.062 (.978)			0.967	.062 (.923)
Period						
1844–1854 (ref)						
1855–1864	1.239	.098 (.205)	1.888	.200 (.855)	1.032	.112 (.117)
1865–1874	1.237	.087 (.160)	2.963	.155 (.002)**	0.828	.106 (.672)
1875–1884	1.048	.077 (.571)	1.454	.161 (.164)	0.865	.089 (.993)
1885–1894	1.166	.070 (.364)	1.886	.148 (.808)	0.920	.079 (.445)
1895–1904	1.074	.073 (.798)	2.269	.136 (.105)	0.776	.086 (.205)
1905–1913	0.936	.084 (.062) ^λ	1.900	.147 (.770)	0.691	.103 (.029)*
N	7,636		2,110		5,526	
R ²	0.005		0.020		0.006	

Note: Categories for missing items are included in all models but are not included in the table.

*p < .05.

**p < .01.

***p < .0001.

^λp < .1.

Table 3. Conceptions in Advent and Lent Time and Effects of Socio-economic, Cultural, and Life-course Characteristics from 1865 Onward.

	All		First		Second+	
	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)
Historical periods 1865 onwards						
Intercept	0.162	.229 (<.0001) ^{***}	0.174	.422 (<.0001) ^{***}	0.164	.305 (<.0001) ^{***}
Location						
Rural (ref)						
Suburban	1.189	.055 (.210)	1.191	.108 (.444)	1.203	.064 (.225)
Urban	1.150	.049 (.472)	1.106	.095 (.925)	1.148	.058 (.601)
Mother's place of birth						
Antwerp (ref)						
Brussels	1.078	.288 (.788)	0.865	.476 (.881)	1.330	.361 (.643)
Other Flemish provinces	0.856	.141 (.281)	0.795	.259 (.958)	0.884	.172 (.161)
Wallonia provinces	0.866	.273 (.604)	0.990	.446 (.645)	0.833	.348 (.389)
Foreign countries	0.952	.183 (.801)	0.878	.321 (.789)	0.991	.226 (.574)
Father's place of birth						
Antwerp (ref)						
Brussels	1.370	.464 (.670)	1.013	.830 (.818)	1.805	.555 (.405)
Other Flemish provinces	0.904	.191 (.254)	0.754	.383 (.205)	0.990	.222 (.536)
Wallonia provinces	1.510	.315 (.348)	3.068	.526 (.081) ^λ	1.116	.402 (.965)
Foreign countries	1.106	.228 (.944)	1.614	.436 (.528)	1.013	.268 (.669)
Mother's social class						
Low (ref)						
Medium	1.130	.109 (.660)	1.246	.219 (.840)	1.103	.126 (.695)
High		NA				
Father's social class						
Low (ref)						
Medium	0.859	.094 (.666)	0.829	.200 (.655)	0.864	.106 (.852)
High	0.646	.194 (.209)	0.380	.443 (.119)	0.768	.213 (.646)
Marriage seasonality						
None (ref)						
Closed period	0.943	.072 (.684)	1.387	.131 (.211)	0.809	.087 (.221)
Mother's literate status						
Nonliterate (ref)						
Literate	1.052	.118 (.091) ^λ	0.987	.313 (.074) ^λ	1.060	.128 (.404)

(continued)

Table 3. (continued)

	All			First		Second+		
	Odds Ratio	SE (p Value)		Odds Ratio	SE (p Value)	Odds Ratio	SE (p Value)	
Historical periods 1865 onwards								
Father's literate status								
Nonliterate (ref)								
Literate	1.054	.190 (.602)		0.969	.450 (.350)	1.064	.209 (.962)	
Marital status								
Married (ref)								
Unmarried	0.941	.077 (.956)		1.076	.121 (.724)	0.946	.102 (.985)	
Age-group								
<20	1.001	.177 (.958)		0.932	.261 (.300)	1.092	.276 (.499)	
20–24 (ref)								
25–29	0.981	.143 (.938)		1.105	.241 (.678)	0.943	.219 (.855)	
30–34	1.101	.145 (.471)		1.450	.255 (.501)	1.023	.220 (.582)	
35–40	1.038	.155 (.767)		1.514	.318 (.500)	0.980	.227 (.728)	
40–44	0.995	.182 (.983)		0.603	.478 (.140)	1.040	.247 (.578)	
45+	1.068	.372 (.841)		2.119	.915 (.547)	1.075	.428 (.690)	
Parity								
First (ref)								
Second	0.988	.073 (.670)			NA			
Third	0.934	.082 (.763)				0.943	.080 (.832)	
Fourth	0.989	.091 (.724)				1.005	.087 (.589)	
Fifth+	0.882	.069 (.233)				0.892	.069 (.293)	
Period								
1865–1874 (ref)								
1875–1884	0.854	.073 (.705)		0.490	.154 (.037)*	1.057	.084 (.415)	
1885–1894	0.944	.065 (.266)		0.620	.138 (.529)	1.122	.075 (.088) ^λ	
1895–1904	0.863	.067 (.795)		0.741	.125 (.458)	0.945	.080 (.582)	
1905–1913	0.751	.078 (.043)*		0.625	.135 (.562)	0.838	.095 (.085) ^λ	
N	6,372			1,721		4,651		
R ²	0.006			0.026		0.007		

Note: Categories for missing items are included in all models but are not included in the table.

**p* < .05.

***p* < .01.

****p* < .0001.

^λ *p* < .1.

Overall, the aforementioned results confirm most of our hypotheses. The results show that religious rules with respect to the timing of marriage are less and less complied with as one progresses from the middle of the nineteenth century to the end of the nineteenth century. These results are largely consistent with those of Lesthaeghe and Lopez-Gay,³⁸ their marriage index for Antwerp starts around 0.3 in 1841–47 (range of 21.6–30.9 of 100 in map 1) reaching 0.65 in 1881–84 (range of 64.0–67.5 of 100 in map 3). As expected, the difference between marriages and conceptions is striking. Compared to marriage, rules on the timing of conception are already substantially less complied with at the beginning of the period and stays in that level for the whole period. For marriages, the rules are better complied with for first marriages than for remarriages, and for Lent better than for Advent, at least for first marriages. For conceptions, the rules are better followed for first conceptions than for second- and higher-order ones (at least) at the beginning of the period. Unlike what is being expected, for conceptions, rules are also better complied with for Advent than for Lent. With respect to determinants, we observe for marriages, the noncompliance of an urban setting, of older women's age and of the later historical periods, and for compliance of high social status of men. For conceptions, we observe relatively few important effects, although like marriages, similar gender differential effects are found. The overall picture that emerges is the reduced compliance with religious rules, and therefore the increasing secularization, but with different patterns for marriages and conceptions.

Two methodological points should be noted regarding the results of descriptive and multivariate analysis. In the first place, conceptions have repeated observations in the studied sample. This implies the interdependency of individual units that needed to be taken into account in the interpretation of results. The second issue is the compliance of rules on first conceptions that are stronger than higher-order conceptions. As marriage and conceptions are highly related, in particular for first conceptions, the better compliance of first conceptions is plausibly related to the stronger compliance of rules on marriage event.

Conclusion and Discussion

The second half of the nineteenth century has been described as a period of secularization, meaning among other things, reduced compliance with religious rules, including at the individual level. The individual-level compliance dimension of secularization means that it should be reflected in individual behavior such as the increased occurrence of events (i.e., marriage and sexual intercourse [conception]) in religious periods when events are culturally not allowed and also not preferred. Against this background, the purpose of this article was to analyze the occurrence of marriage and conception in Lent and Advent, and the individual determinants of socio-economic, cultural, and life-course factors. One key measure used in this article was the DLA index, capturing the difference between observed and expected numbers of events in the exact Lent and Advent periods.

Overall, our results show reduced compliance with religious rules as the nineteenth century progresses, and therefore, in some extent, the increasing secularization, but with overall different patterns for marriages and conceptions. Marriages are public events subject to external social control, and the rules are much better complied with than for conceptions. These results confirm our hypotheses. In addition, for marriages, the rules are better complied with for first marriages than for remarriages, and for the more important period of Lent than for Advent, at least for first marriages. This is clearly in line with our expectation as first marriages are subject to greater social control than remarriages. For conceptions, the rules are better followed for first conceptions than for second- and higher-order ones (i.e., at least at the beginning of the period). This is also in line with our expectation as social pressure can be assumed to be higher for first than for higher-order conceptions. For conceptions, rules are better complied with for Advent than for Lent, which is out

of line with our hypotheses. We would expect here a greater compliance for the more important period of Lent. With respect to determinants, we observe in line with our hypothesis at least for marriages the clear significance for noncompliance of structural, cultural, and life-course factors. These are found in an urban setting, older women, and later historical periods, and for compliance of high social status of men. For conceptions, we observe relatively few significant overall effects but similar trends.

The aforementioned results must be kept in perspective. The nature of the COR* historical sample and related methodological issues need to be taken into account. First, the number of events in the population-based (COR*) letter sample is not very large, and information is not always complete. For instance, all information derives from records for births in the Antwerp arrondissement. But for mothers included in the sample who had married outside the Antwerp arrondissement, marriage information is not always complete, introducing possible bias. Also, the analysis takes into account of civil and population registers, but not the church registers which probably have effects on dates registration. The intergenerational selectivity bias, as a result of presence of parent-child linkage, additionally removes the possibility of studying overall marriage and conception seasonality patterns and its determinants of socio-economic, cultural, and demographic characteristics of their parents. Related to this point is the presence of repeated observations in the analytical sample. Since conceptions at the individual levels are nested to parental characteristics, this implies the interdependency of individual units that needed to be taken into account in interpreting overall results. In addition, our observation period is truncated in 1913 due to the data and research design (i.e., excluding First World War period 1914–1918). This means the observation period comprises only about thirty years of that transition since the onset of first demographic transition (roughly 1880).

In spite of these reflections, we are able to put forward the following guarded conclusions. In the first place, regression results show trends in line with other empirical research, but model results are not always fully convincing and deserve careful investigation. Secondly, analyzing marriage and sexual intercourse (i.e., conception) seasonality patterns and its determinants on the basis of a letter sample, individual-based civil registration and population registers, has both advantages and disadvantages. The former concerns the extensiveness of individual-level information and for the latter the level of completeness. Thirdly, applying this to historical Antwerp (mid-nineteenth to early twentieth century) is a challenge where high immigration and emigration is being observed. This means the case study of historical Antwerp needs to be understood in the framework of high rates of immigration and emigration given the economic development of the port activities. Further, some issues such as examining interactions of biological and sociodemographic factors on conception are important to investigate.³⁹ And furthermore, in light of these outcomes, it is important to consider survival⁴⁰ and longevity.⁴¹ Clearly, these biological factors are equally important to investigate, although they are beyond the scope of the current research. And lastly, the interplay between socio-economic and cultural factors within this historical period must be carefully interpreted. Historical research shows that while the study period was characterized by rapid societal transformation including industrialization, urbanization, and to some extent, secularization, pillarization also started to be increasingly present as a strong reaction to these social upheavals. While attempts are made in this article to deal with this, it remains true that the actual extent of secularization, particularly at the individual level, is extremely difficult to measure.⁴² In the future, a similar analysis of seasonality of demographic behavior can be examined in other regions for an extended historical period. Such analysis will allow us to test our hypothesis further: as to whether secularization at the individual level throughout the nineteenth century is present or not; and as to whether this has resulted into a reaction of pillarization at the institutional level in the twentieth century. For this, increasingly available individual-based longitudinal historical demographic data will provide us ample opportunities.

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