How Socioeconomic Factors Affect Average Age of First Birth in Canada*

Sevnur Kulak   Dongqi Bi   Ivan Li

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Abstract

The average age for having a first child has been shifting from early 20s to older ages recently. This paper investigates potential factors to research on likelihood of having children at an early age depending on gender, education level, occupation, income, and mental health. Whereas women are more likely to have their first children at earlier stages of their lives compared to men, education, occupation, and income are other factors which have an impact for individuals to have their first child in later stages of their lives. It is crucial to assess the underlying factors of this changing trend for further application in the labor market and potential upcoming health outcomes for women.

Contents

1 Introduction

The trend on having children in early ages has been shifted within the last couple of decades. According to Statistics Canada, the average age of mothers having their first children has been steadily increasing since the mid-1960s (Government of Canada 2018b). Becoming concentrated around the age 30 to have their first babies, people also prefer to have less children overall which leads to having the responsibility of child caring spread in a shorter span of time compared to the trend of having their first children in their early 20s trend in the early 1900s (Government of Canada 2018a). There are potential factors which might have contributed to

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*Code and data are available at: https://github.com/hellowoshibb/Age_of_First_Birth_Analysis

such an outcome. According to recent research in Pew Research Center, "Women and (men) have taken longer to complete their education, establish themselves at work, achieve financial independence from their parents and get married" (Cohn 2020). Similarly, some believe such a trend is caused by specific factors to a region. For instance, researchers think the increased housing prices might be one of the main reasons that British Columbia has been seeing the biggest change in the maternal age ("B.c. Sees Biggest Changes in Maternal Age - Researchers Blame Housing Prices | CBC News" 2019). Moreover, another article on the issue by The New York Times suggests that the maternal age significantly varies depending on the geographical areas and the level of education ("B.c. Sees Biggest Changes in Maternal Age - Researchers Blame Housing Prices | CBC News" 2019). Not only in Canada, the same pattern has been observable in the United States as well. According to the same article, In big cities such as New York and San Francisco, the average maternal age is now shifted to 31 and 32, whereas in smaller towns such as Todd Country, Zapata Country, etc. the average maternal age is 20 and 21, mentioning, "Women with college degrees have children an average of seven years later than those without - and often use the years in between to finish school and build their careers and incomes" (Bui and Miller 2018). In this paper, we will be examining the likelihood of having children at early ages depending on the factors such as gender, education level, occupation, income, and mental health in Canada. We gathered the data from the Statistics Canada, General Social Survey C31 Main Survey-Family. We believe it is very important to investigate the potential variables which would have an impact on the likelihood of having children at earlier or later ages. Depending on any variables, further research could be conducted to analyze any need for additional employee benefits, especially related to maternity and paternity leaves, as well as the trend's potential health outcomes for mothers in the future. So, the paper aims to be helpful in the labor market and maternal health in pregnancy periods. To conduct our analysis, we divided potential variables into four main categories. First, we looked at the age distribution of Canadians in which they are more likely to have their first children, and then conducted a similar graph by looking at each participants' gender. As the second group of variables, we wanted to assess the socioeconomic factors on the outcome, therefore used the education levels of each participant. For the third group of variables, we picked to use occupation and income of individuals to further investigate socioeconomic factors. Lastly, we checked if there is any relationship between satisfaction levels of life of the individuals and early parental age. We found that Canadians are more likely to have their first children in earlier ages since the age distribution graph is right skewed and women lean more to have children at earlier ages compared to men. As the other research in the literature suggests, the more education someone gets, the less likely they are to have babies in their earlier ages. Similarly, the other socioeconomic variables of occupation and income factors also affect the likelihood of having children at earlier ages negatively. More the people earn, the less likely they are to get kids at an earlier age. Moreover, people with occupations that require post-secondary education are more likely to have children later stages in their lives. In contrast, although the potential relationship of satisfaction level of life and the average age of first child is not significant, individuals in the 25-30 age range have slightly higher satisfaction levels, whereas individuals below 20 years old have one of the lowest satisfaction levels of life. Our findings are important not only to accept and approve previous research on shifting trends of average age of the first child, but also to utilize these findings in employment rights and needs such as maternal paternal leave policies or to investigate more on the potential health outcomes of such a changing trend and its impact on women's health in the future. The paper will proceed with the Data section in which we will be talking about the features of data and variables as well as explaining the graphs we used in our analysis. Then in the Results section, we will further elaborate on our findings, summarizing each graph and their outcomes. Proceeding with the Discussion section, we will be discussing the learnings and applications of our results in the case of increasing average maternal age. Additionally we will be mentioning the potential weaknesses of the paper as well as further research that could be conducted in the future. The paper then follows with the Survey section in which we construct our own survey with several questions, aiming to cover the weakness of the original survey.

2 Data

The dataset we chose is collected from the Canadian General Social Survey (GSS) Cycle 31 Main Survey - Family. The GSS program was developed in 1985 in Canada with six survey themes, each focusing on a different topic in depth. (Government of Canada 2017) The six themes are caregiving, families, time use,
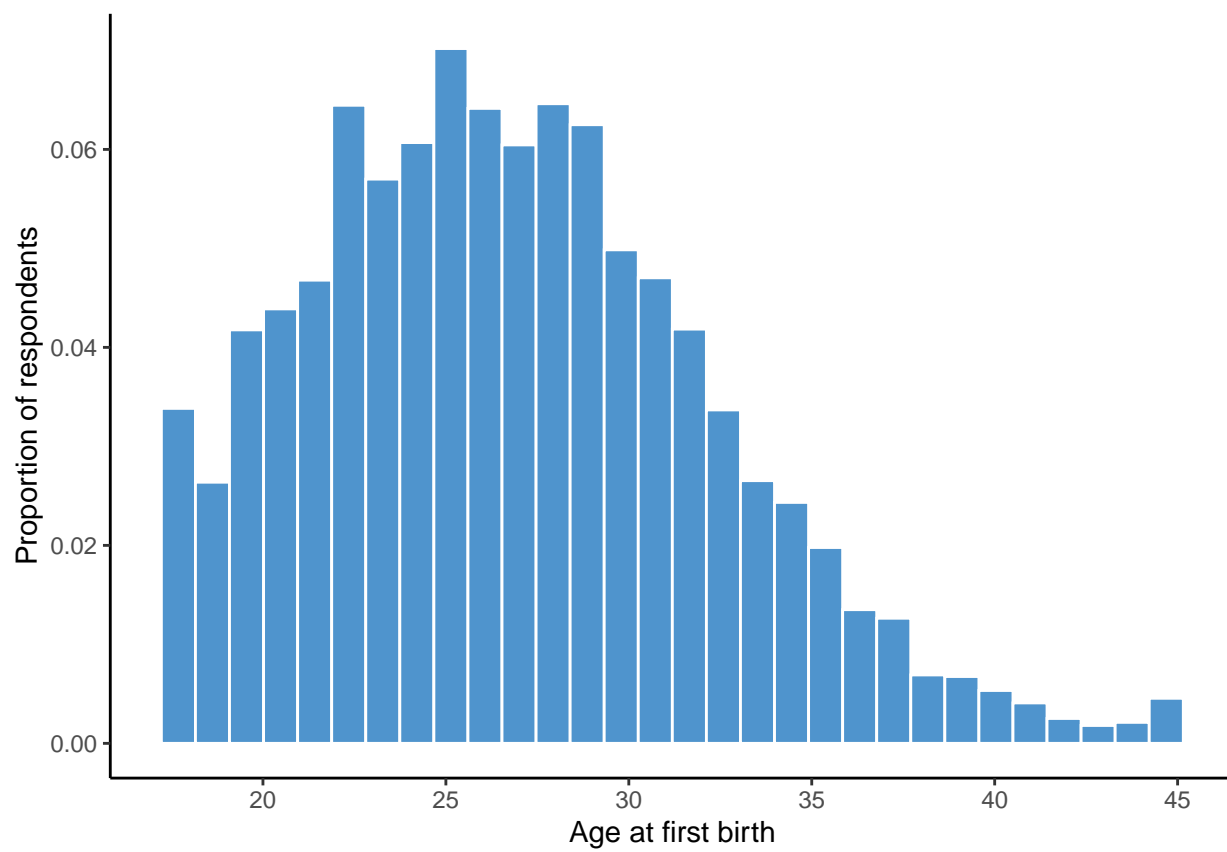
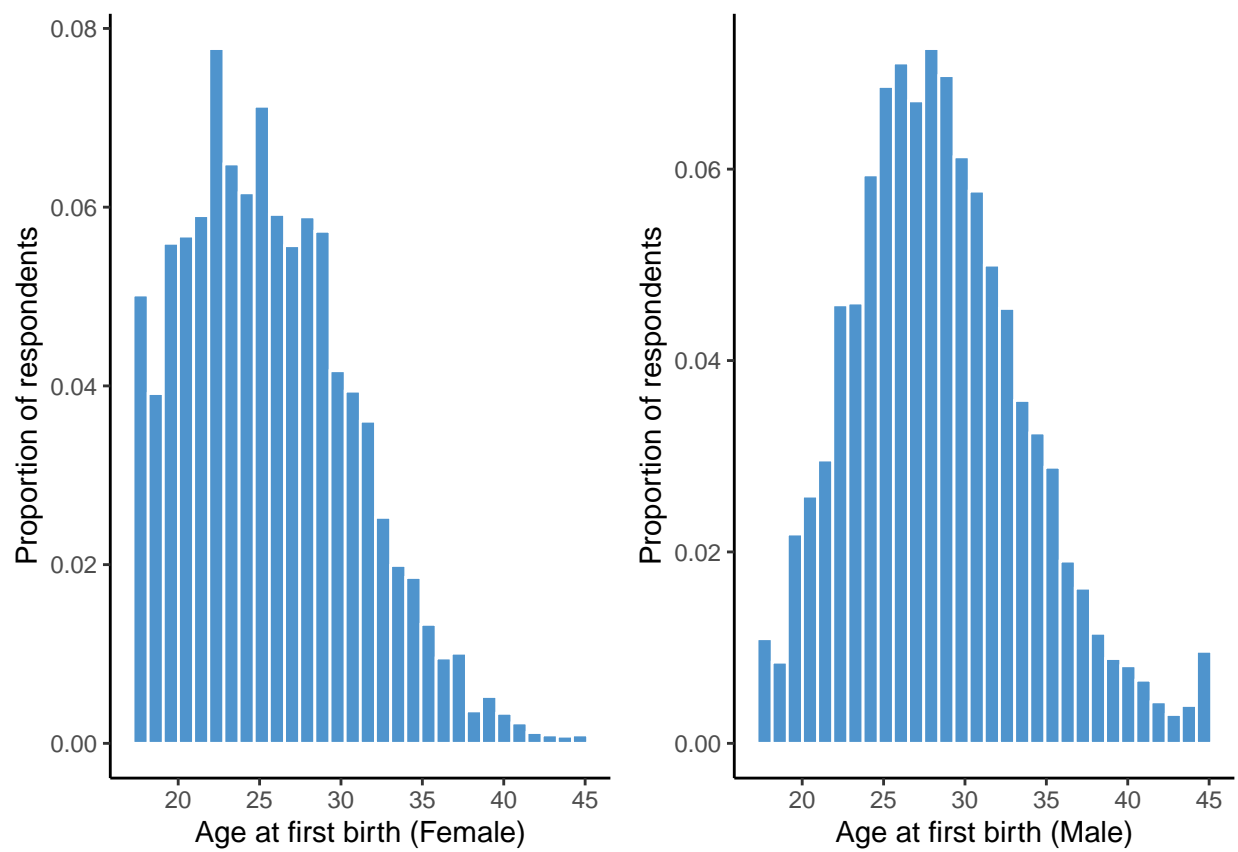Figure 1: Distribution of age at which respondents have their first child

Figure 2: Distribution of age at which respondents have their first child by gender
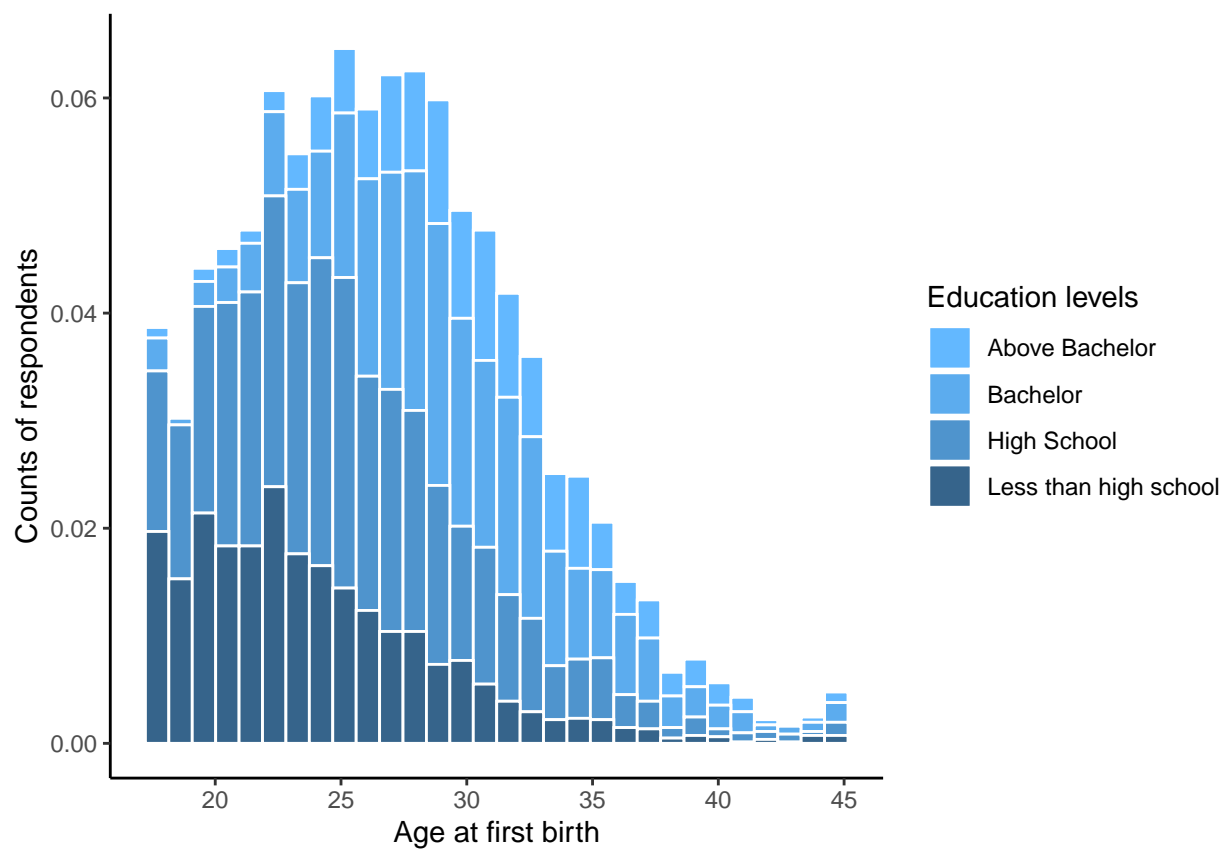
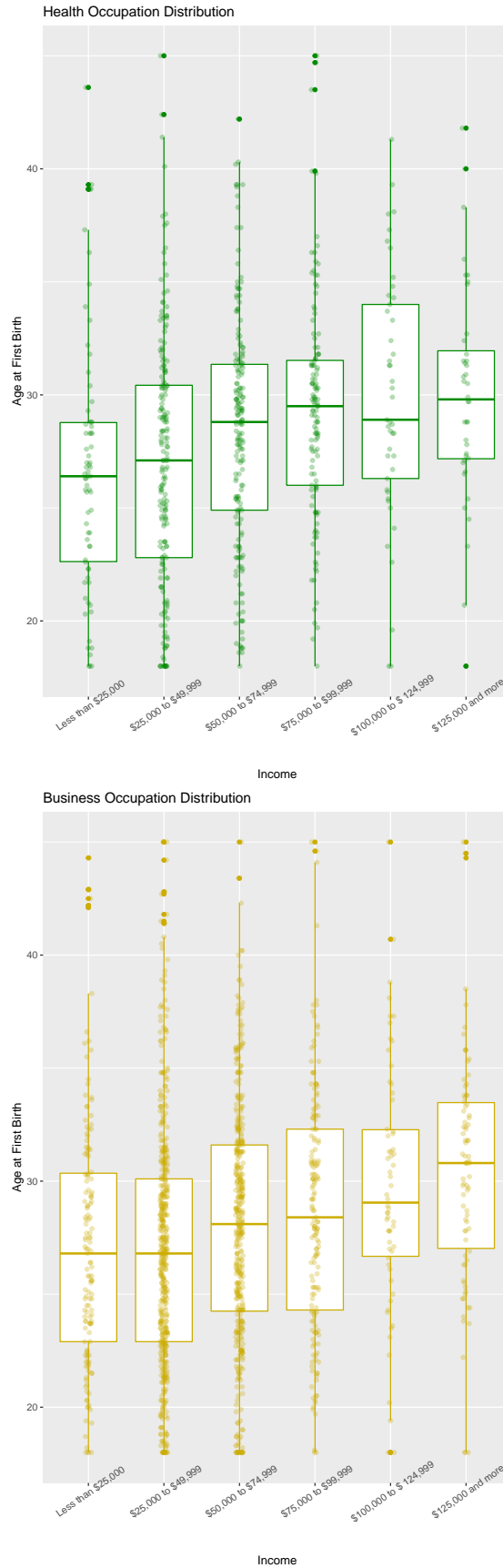Figure 3: Distribution of age at which respondents have their first child by education levels

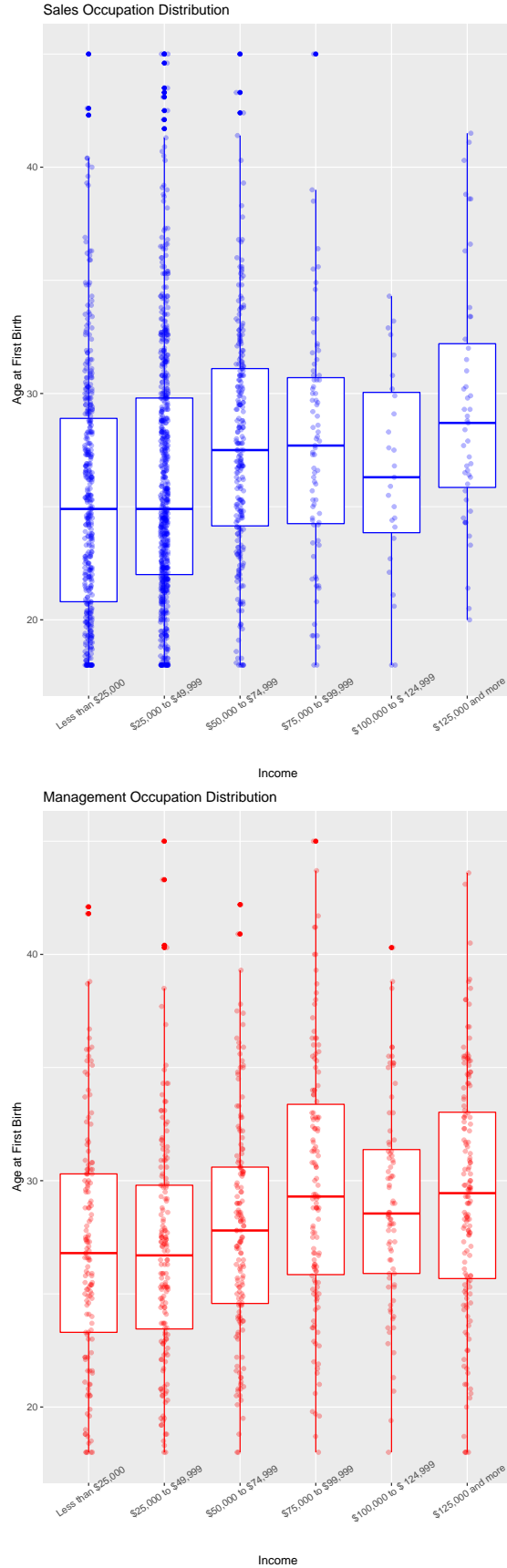Figure 4: Part1 : Distribution of age at which respondents have their first child by occupation and income

Figure 5: Part2 : Distribution of age at which respondents have their first child by occupation and income
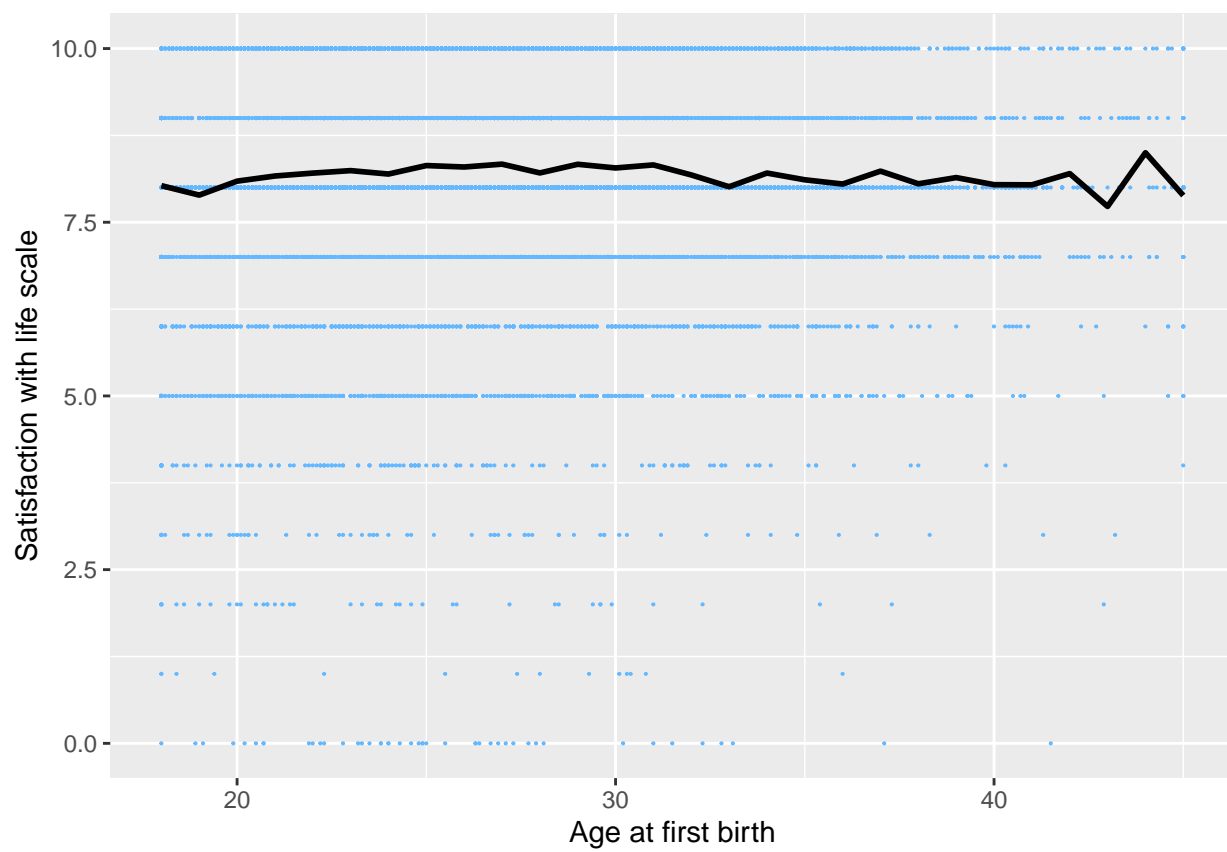
Figure 6: Feelings about life as a whole vs age at which having their first child

social identity, volunteering, and victimization. (Government of Canada 2017) Each of them is used to aim at a different aspect of improving Canadian's well-being, informing social research, and acting as an effective training tool for quantitative analysis. (Government of Canada 2017) Our paper is interested in the socioeconomic factors that could potentially affect the average age of first birth in Canada. Since our subject is closely related to the parental history, household information, education and health information of Canadian families, and these are the survey's subjects; we choose the "Families" theme over other themes. It contains all the variable information that we needed. What is good about this survey is that the questions in the survey contain so much information that covers every aspect of respondents' families, which makes it useful for many topics in in-depth statistical studies. The weakness of this survey is that it might be too long to answer, resulting in a high abandonment answering rate. In addition, most of the answering options for the survey are collected as non-numeric, discrete, categorical data instead of continuous numeric values—for example, income less than 25k instead of the actual income number. The disadvantage is that quantitative analysis is hard to perform on top of the categorical data, and limited types of graphs can be produced using discrete values.

In particular, we choose Cycle 31 of the GSS Families survey; The data is collected from 2017-02-01 to 2017-11-30 with a target demographic of all non-institutionalized people aged 15 and up who live in Canada's ten provinces. (Government of Canada 2019). The data is collected using a cross-sectional design, combing landline and cellular telephone numbers. (Government of Canada 2019) The selection process of the data collection used a stratified sampling method, a method of dividing a population into smaller groups called strata and selecting random samples from each strat (Nickolas 2021). In this survey, the strata are at the province level; proxy replies are not authorized for this survey. The advantages of using this sampling approach are that it is free from researchers' bias since it is selected by strata and has as many representative samples from each stratum as possible. Landline and cellular telephones are the most commonly used telecommunication medium, so it is adequate to use them to reach out to people. And by phone, they can decide who is answering the survey. The disadvantage and trade-offs of this sampling approach are that it is impossible to select all differences by selecting random representations and classifying every community member. And calling people by cellular telephones and landlines will need to use a lot of manual labour than asking people to answer online surveys. The non-response data in the survey is either DK which means "don't know," or RF, which means "refuse to answer." These answers are changed into NA in our data cleaning step and are removed when we make analysis plots.

For Figure 1, 2, 3, 4, 5, Our response variable is "age at first birth," which is the respondent's age when they have their first child. We used other variables in this paper as factors to analyze their relationships with the "age at first birth" variable. We have gender, including females and males. Income levels which contains 6 levels: Less than $25,000, $25,000 to $49,999, $50,000 to $74,999, $75,000 to $99,999, $100,000 to $124,999 and $125,000 and more. Occupation types include heath occupation, business occupation, sales occupation and management occupation. And the respondent's rating about the level of satisfaction with life scaling from 1 to 10.

Figure 1, we have the distribution of age at which respondents have their first child. The x-axis is the age at which respondents have their first child, and the y-axis shows the percentage of the respondents in this age group of the entire sample. The age group is divided into small groups with individual bars representing them from age 18 to 45. Each bar is approximately representing one year of age. At two endpoints of the graphs, the first bar represents age 18 and under age 18, and the last bar represents age 45 and above age 45. The heights of the bars show the popularity of this age group. Figure 2 is similar to Figure 1; the difference is that we divide the distribution graph by gender, and we use it to analyze how gender as a factor influences the age of people who have their first child. Figure 3 is another distribution graph; we split the distribution into different education levels, we can see the portion of people in each education level in a diverse age group. For instance, at age 25, most people have their first kid in a high school education level, and a tiny portion of people have above bachelor education. In Figure 4 and Figure 5, we have four boxplots. Each boxplot analyzes data based on one type of occupation; we have heath, business, sales and Management. Each boxplot also contains six boxes representing an income level from less than $25,000 to more than $125,000. Within each box, it draws from the first to the third quartile of the data of age at which respondents have their first child. At the median, a vertical run through the box. We also add raw data points to our boxplots to better visualize the distribution of data points. In our last graph, Figure 6, we

have the x-axis as the age of first birth and the y-axis as respondents' rating regarding their satisfaction with life from 1 to 10. The trendline shows the average life satisfaction rating as the age at first birth increases, and we also add raw data points to this plot to visualize the spread of sample points.

3   Results

From the raw data displaying the distribution of first birth ages (Figure 1), we see that Canadian partners are reported most often to have their first child at the age of 25. The graph shows a right skew indicating that most Canadians have their first child early on in life (in their 20s). Notable are the spikes in frequency at the end of the graph, at ages 18 and 45. This is due to the survey methodology not recording ages below 18 and above 45. As a result, all ages below 18 and above 45 are condensed into the same values, providing an explanation.

By grouping the data by gender and plotting multiple graphs, we are given a comparison of the average age of when one has their first child between women and men. (Figure 2) shows that in Canada, females are inclined to have children earlier than men do. We observe a right skew in the distribution for females, with the most common age to have a first child being in the 20-25 interval, while the male distribution is less skewed and the most frequent ages are in the 25-30 interval. By separating the graphs by gender, we can determine that the spike in (Figure 1) at ages above 45 are caused entirely by men, and it is observed that a very low proportion of women have their first child after 40-45 years of age. This could be explained by women gradually becoming unable to have children as a result of natural human aging, and men choosing to have partners and have their first child at older ages with women of younger age. The conclusion from this also may also provide an explanation to why the average age for men appears to be higher than for women.

In order to gain more information about the relationship between socioeconomic factors and the age that Canadians have their first children, we plotted the data from our first graph once again, but grouped information between different education levels of individuals. (Figure 3) shows varying levels of skew between different education groups. Generally, it can be seen that the higher education level that one receives, the later they have their first child on average. This can be observed in the 25-30 age range, where as births for people with less than a high school education are shown to be decreasing, births for people with a bachelor's education or higher peak. As these individuals are still in their studies through their early and mid 20s, compared to those who stop education before or after high school and therefore not distracted by post-secondary education, it is reasonable to believe that one of the contributing factors towards this trend is the burden of post-secondary education distracting individuals from choosing to have a child, consequently delaying their opportunities years later than those with no post-secondary education.

We then wanted to compare the impact of an individual's occupation and income on our findings. To do this, our observations were grouped into four different occupation categories, and the summary statistics for the average age of having a first child were displayed in order from occupational income, resulting in 4 boxplot graphs containing statistical information for each income level within an occupation, shown in (Figure 4). Results trend towards individuals with higher incomes having their first child at later ages compared to lower income individuals across all four occupational categories. It can also be observed that from our dataset, individuals working in sales have children the earliest compared to the other occupations. The mean age in the lowest income bracket is observed to be below 25, and the mean in the highest bracket is further from 30 than the other occupations. Possible explanations could be that less time is required in post-secondary studies in the sales occupation compared to health, business, and management, which often require post-undergraduate studies to enter the industry.

Lastly, we attempted to compare findings between the age that individuals have their first child and their self-assessed satisfaction of life as reported on the survey. The raw data of the survey comparing age at first birth vs life satisfaction is included along with a line graph showing the mean satisfaction level of each age in (Figure 6). From the graph we can observe that there appears to be no significant relation between life satisfaction and average of first child, although there are some notable results. Individuals who have their first child between 25-30 report to have slightly higher life satisfaction than other age periods, and individuals below 20 years old report the one of the lowest satisfaction ratings in the dataset. The strange

peaks and troughs at years 43-45 are likely attributed to the low number of observations for that age range, as seen by the raw data. A higher sample size would be needed to obtain a more accurate picture of the relationship between first birth age and satisfaction at much older ages.

4   Discussion

5   Survey

6   References

Appendix

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