

**What makes residents of Canada happy?
Determinants of life satisfaction in Canada**

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Abstract. This study investigates the determinants of happiness in Canada in the years 2006, 2010, and 2016 by relying on the *2006 General Social Survey (GSS) Cycle 20*, the *2011 General Social Survey (GSS) Cycle 25* and the *2016 General Social Survey (GSS) Cycle 30*. It contributes to the literature by employing ordered probit models consisting of a set of individual characteristics and socioeconomic characteristics. This paper suggests that good health, marriage, participation in religion, and household income have a significantly positive effect on human beings' happiness. Some other interesting findings are that the relationship between age and happiness behaves like a "U" shape, that females in Canada are happier than males, and residents of Ontario are the least satisfied with life in general compared with residents living in other provinces.

Keywords: determinants of happiness, Canada, ordered probit model, marginal effect

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1. Introduction

While governments pay attention to economic growth, economists argue that the ultimate goal of economic development should be to improve the well-being of human beings, based on both material and spiritual aspects (Eren and Asici 2017). Various institutions and intergovernmental organizations have paid a lot of attention to the happiness of human being in recent years. For example, the United Nations (UN) Sustainable Development Solutions Network is publishing the *World Happiness Report* on an annual basis. It recently released the rankings of national happiness in 2020, an annual ranking of 156 countries by their happiness levels as rated by their residents. Surprisingly, Canada slipped out of the “Top 10” for the first time in history, from 9th place in 2019 to 11th place this year, whereas it used to rank 5th in 2015, 6th in 2016, and 7th in both 2017 and 2018. It can be argued that Canadians’ happiness overall is continuing a downward drift compared with other countries, even if Canada is still one of the happiest countries in the world. It is important for Canadian researchers to analyze the driving factors of happiness of residents of Canada to ultimately mitigate or even reverse this trend. What can make residents of Canada happier? Will Canadian residents with higher incomes or higher educational attainment be more satisfied with their lives? As we all know, the financial crisis of 2007-08 hit global economies severely; did it also affect the well-being of residents of Canada, and how? To answer all the above questions, this study pays attention to the determinants of happiness of Canadian residents in three separate years: 2006, 2011, and 2016.

The analysis of the happiness of residents of a country can be conducted on two levels: the macro level and the micro level. Some previous researchers focus on the macro analysis of happiness, measuring the relationship between national income and the well-being of citizens (e.g., Eren and Ssici 2016; Takahashi et al. 2018). Some scholars try to investigate the determinants of happiness on a micro level, such as the impact of household income, housing conditions, and health status on an individual’s happiness (e.g., Cheng et al. 2014). This paper mainly focuses on examining the determinants of happiness from an individual perspective (micro level) using data from the *2006 General Social Survey (GSS) Cycle 20*, *2011 General Social Survey (GSS) Cycle 25* and *2016 General Social Survey (GSS) Cycle 30* for Canada.

Among the large existing empirical literature on happiness, it is common to see ordered logit models (e.g., Takahashi et al. 2018; Ferrer and Frijters 2004), ordered probit models (e.g., Cheng et al. 2014), and OLS methodologies (e.g., Cheng and Smyth 2015) being used. The ordered

probit model is introduced in this paper for two reasons: Firstly, as Elmslie and Tebaldi (2014) suggest, empirical results obtained using OLS and the ordered probit model should be aligned with each other. Secondly, the response variable for happiness in this paper is on a scale of 0 to 10 or 1 to 10, indicating rankings rather than measures. In addition, this paper has converted all explanatory attributes into dummy variables.

Conclusions derived from the ordered probit model and the marginal effects found for each variable are basically consistent with the findings of previous research. Having a good state of health, being married/in a common-law relationship, having a religion, and a high household income have a significantly positive effect on human beings' happiness (e.g., Elmslie and Tebaldi 2014). In contrast, living in an urban area plays a significantly negative role in people's life satisfaction (e.g., Cheng et al. 2014). Besides, females have a higher probability of being the most satisfied with their lives than males, and respondents with one or two children living in the household are significantly unhappier than those without any children (e.g., Chui and Wong 2016). The study has found that the relationship between age and happiness resembles a "U" shape. It is counterintuitive that respondents with higher educational attainments are not necessarily happier. Lastly, this paper does not detect a significant change in the average level of happiness before and after the 2008 crisis.

The remainder of this paper is organized as follows: Section 2 surveys the literature on the measurement of happiness, the determinants of happiness including individual determinants and socioeconomic determinants, as well as the estimation methods utilized in previous studies. Section 3 provides data sources, and descriptive statistics. Section 4 presents the procedures undertaken in constructing econometric models and the definitions of the explanatory variables. The empirical results are analyzed and discussed in Section 5. Finally, this paper concludes by summarizing its findings and limitations in Section 6.

2. Literature review

There is a large literature on happiness (e.g., White 2006; Takahashi et al. 2018) and the determinants of happiness, including personal characteristics (e.g., Cunado and Gracia 2012; Chui and Wong 2016) and socioeconomic factors (e.g., Meer and Wielers 2013; Bonikowska, et al. 2014; Hsu, et al. 2016). Various econometric methodologies such as the ordered logit model (e.g., Takahashi et al. 2018), the ordered probit model (e.g., Chyi and Mao 2012; Cheng et al. 2014; Elmslie and Tebaldi 2014; Bonikowska et al. 2014) and OLS (e.g., Cheng and Smyth 2015; Bonikowska et al. 2014) are widely used to analyze the relationship between the above characteristics and happiness.

2.1. Measurement of happiness

What is happiness? In his book *A Brief History of Happiness*, White (2006) answers this question and briefly summarizes the history of changes in the definition of happiness. As early as the fifth century B.C., a Greek Sophist named Gorgias started the first dialogue about happiness. He suggested that people's happiness mainly depends on getting whatever they want. Later in Plato's dialogue named "Gorgias," Plato expands on Gorgias's point and proposes that where there is a desire, it should be satisfied as much as possible. After constant corrections and adjustments, a much more systematic version of Plato's idea was born in the mid-seventeenth century. Hobbes named it "felicity."¹ However, when an individual has multiple desires at the same time, a new problem arises: what to do first? That is the so-called "conflict of aims."

Aristotle tries to give us the answer to this question. He thinks that considering all desires is not equivalent to fulfilling all of them. Furthermore, he also said that "happiness is 'the human good,' and that everyone strives to attain it for its own sake and its own sake alone." (White 2006, pp. 2). The importance of this theory has never been shaken until Freud wrote "What do they demand of life and wish to achieve in it? The answer to this can hardly be in doubt. They strive after happiness; they want to become happy and to remain so." (White 2006, pp. 2).

Other than the above classic theory of happiness created by those famous philosophers in history, there are also some more recent researchers who have contributed to the concept of

¹ Felicity is a synonym of well-being.

happiness. Takahashi et al. (2018) conclude that there are three basic concepts of happiness: eudemonic well-being, life evaluation, and positive and negative affect.

Helliwell (2018) emphasizes the importance of measurements of happiness and suggests using subjective life evaluation to quantify people's happiness. Particularly, Helliwell (2018) provides four critical reasons for using individuals' own life evaluations, rather than using other constructed indices of social and economic welfare: (1) they provide an emphasis on personal evaluation; (2) they can help identify factors contributing to better lives; (3) they make possible a more meaningful statistical approach; and (4) they are independent of the priorities and opinions of index-makers.

2.2. Individual characteristics affecting happiness

This section combines three streams of literature on individual characteristics which may affect happiness. First, there is one extensive journal article researching the relationship between happiness and religious affiliation (Jung, 2014). Second, Cunado and Gracia (2012) focus on the effects of educational attainment on well-being. Lastly, Chui and Wong (2016) use Hong Kong data to investigate the impact of gender on happiness.

How do gender and religious affiliation affect happiness? To answer this question, Jung (2014) conducts an analysis based on data from the 2009 Korean General Social Survey. After incorporating several dummy variables representing different categories of religious affiliation together with other control variables (gender, age group, marital status, education level and so on) in an OLS regression model, Jung (2014) concludes that people who attend religious activities more often are significantly happier than those who do not. However, this positive relationship may exist only for women and/or Protestants. Additionally, Jung (2014) finds that there exists a negative relationship between happiness and age, but a positive relationship between happiness and income. Individuals who are married are relatively happier.

Cunado and Gracia (2012) investigate the relationship between education and happiness in Spain using individual-level data from the European Social Survey. Their study focuses on not only the direct impact of education on happiness, but also the indirect impact of education on happiness. Besides education, Cunado and Gracia (2012) introduce multiple other factors

(including age, gender, health status, income, marital status, children and main activity²) that they believe may affect the level of happiness into their model. The empirical results indicate that education can affect happiness in a positive direction both directly and indirectly. The indirect impact is reflected mainly through income level and labour force status; people with higher educational attainment are more likely to be employed and have higher income, thus they may be happier. In addition, gender, marital status, and health status are found to be significantly related to happiness, while the relationship between age and happiness is found to be U-shaped.

Gender can be one of the determinants of happiness among younger generations. The research conducted by Chui and Wong (2016) uses data from a non-governmental survey in Hong Kong to investigate the relationship between gender and happiness. Their sample focuses on teenagers aged 10-19. Other than gender, the research includes the number of close friends, the purpose of life, parents' marital status, academic achievements, self-esteem and background factors as explanatory variables. The results indicate that holding all the other factors equal, girls are happier than boys. However, boys with higher academic achievement are happier than girls. Additionally, the number of close friends plays a significantly positive role in happiness for both boys and girls.

2.3. Socioeconomic characteristics affecting happiness

There is a growing and emerging economic literature that investigates the determinants of happiness from a socioeconomic perspective (e.g., Meer and Wielers 2013; Hsu et al. 2016).

Meer and Wielers (2013) analyze the determining factors of the happiness of workers in Europe. They use the European Social Survey 2004, which contains data from 22 European countries. They restrict the data set to people who are involved in paid work and are aged between 25 and 60. Meer and Wielers (2013) estimate an ordered probit model including income, hours of work, and job characteristics. They conclude that part-time workers are happier than full-time workers because the positive effect of income might be dominated by the negative effect caused by more hours of work; according to labour supply theories, employees try to maximize their utility by optimizing the bundle of income and hours of leisure. In addition, the positive effects of a potential career development path on happiness are significant, while irregular working hours'

² Main activity has seven categories: paid work, education, unemployed and looking for a job, unemployed but not looking for a job, permanently sick or disabled, retired, housework and children.

effects are small. Lastly, they find that the effect of education on workers' happiness is negative, and employees from different countries have different subjective well-being levels. The counterintuitive conclusion about education is explained by suggesting that education is treated as an input into jobs, like hours of work.

Hsu, Chang, Chong, and An (2016) research the social determinants of happiness across three groups in Taiwan: a younger group, a middle-aged group, and an older group. They use data from the Taiwan Social Change Survey, and conclude that there is no obvious difference in the level of happiness among the three age cohorts, while the determinants of happiness vary across age groups. For instance, socioeconomic status can affect the elderly more strongly, and social relationships can be significantly related to the happiness of the younger group and the middle-aged group.

Bonikowska, Helliwell, Hou and Schellenberg (2014) present the year-to-year variability of subjective happiness responses, and they also investigate the socioeconomic characteristics associated with life satisfaction using both Statistics Canada's General Social Surveys (GSS) and the Canadian Community Health Surveys (CCHS). Bonikowska et al. (2014) find that the distribution of responses collected from the GSS varies, while it stabilizes in the CCHS. In addition, the sign and magnitude of effects of socioeconomic characteristics on happiness are basically consistent between the two Statistics Canada surveys. The results show that paid workers are happier than the unemployed, and households with an income of more than \$100,000 are significantly happier than those with an income of \$60,000-\$99,999. In addition, adult immigrants are less satisfied with life than Canadian-born residents. Home ownership also plays a significant role in affecting the well-being levels of Canadians.

2.4. Methodology for analyzing happiness

Happiness data are always obtained from questionnaire answers that are discrete, unlike most economic indicators (Eren and Asici 2017). It is common to see researchers estimate ordered logit models (e.g., Takahashi et al. 2018), ordered probit models (e.g., Chyi and Mao 2012; Cheng et al. 2014; Elmslie and Tebaldi 2014; Bonikowska et al. 2014) or linear regression models (e.g., Cheng and Smyth 2015; Takahashi et al. 2018) of happiness. Chyi and Mao (2012) also use instrumental variable estimation to deal with the problem of endogeneity of living arrangements. Several studies compare the results obtained using different econometric models. However, Elmslie and Tebaldi

(2014) argue that different estimation methodologies may have little impact on the magnitude or significance level of coefficients.

What can make urban workers happier? To answer this question, Cheng, Wang, and Smyth (2014) use an ordered probit model (OPM) which incorporates two vectors of variables: one is a vector of personal characteristics (gender, age, education, marital status, health status, and number of children), and the other is a vector of socioeconomic characteristics (living space, social network, employment characteristics, hourly income, etc.). In their other paper, Cheng and Smyth (2015) investigate the relationship between sexual activity and happiness. Instead of using an OPM as in their previous paper, Cheng and Smyth (2015) treat happiness as a cardinal variable this time, and use OLS estimation instead. Cheng and Smyth (2015) draw the conclusion that both the frequency of sex and quality of sex are positively related to happiness.

To estimate both marital happiness and general happiness, Elmslie and Tebaldi (2014) also employ the OPM together with two other specifications: a probit model and a recursive bivariate probit model (RBPM). However, they find that different estimation methods have little effect on the magnitude or significance of coefficients. They use U.S. General Social Survey (GSS) data for those years from 1991 to 2012 which contain questions regarding happiness, but restrict the sample to married respondents who were born in the 1960s. As a result, Elmslie and Tebaldi (2014) find that infidelity has a strong negative effect on marital and general happiness. Younger people are happier in marriage and in general. Religions attendance is not strongly associated with marital and general happiness. A college degree is not significant in the determination of happiness.

Takahashi, Fukushima, and Hagiwara (2018) study the determinants of happiness in Japan and in the Netherlands at both the macro level, where they use average life-evaluation as the dependent variable, and at the micro level, where they make the individual's life-evaluation the dependent variable. At the macro level (city-level), they estimate a Fixed Effects Model, a Random Effects Model, and a pooled OLS Model. They find that social support has a significantly positive impact on happiness in both Japan and the Netherlands. GDP per capita plays a significantly negative role in happiness in Japan, which is consistent with the "Easterlin Paradox," proposed by Richard Easterlin in 1974. The "Easterlin Paradox" states that the overall level of people's life satisfaction does not increase with the continuous growth of GDP of their country over time. However, in the Netherlands, GDP per capita affects happiness positively but not significantly. For micro level analysis, Takahashi et al. (2018) include four explanatory variables in a univariate

analysis: scales of incomes, family trust, general trust, and freedom of choice. The results show that Japan's welfare is based on families, while citizens in the Netherlands show greater trust in each other. In addition, freedom of choice plays an important role affecting individual happiness in both countries.

To explore the determinants of the happiness of elderly people in China, particularly the impact of living with their children or grandchildren, Chyi and Mao (2012) estimate both OLS and ordered probit models using data from the Chinese General Social Survey of 2005. Since the unobserved permanent income is likely to have impact on both the elderly's living arrangements and their happiness, there might exist the problem of endogeneity. Thus, they also use instrumental variables (the number of living children of an elderly person, the age of the elderly person's eldest child and its square) to reduce the effects caused by endogeneity of living arrangements. Chyi and Mao (2012) conclude that old people living with grandchildren can be much happier. However, if their own children also move to live together, the impact will be negative. In addition, there is no significant relationship between the elders' happiness and their living arrangements.

Another issue that cannot be ignored when investigating life satisfaction is endogeneity. Life satisfaction of human beings is determined by a large number of factors, and the direction of causality in the relationship between happiness and its determinants is difficult to determine (Hajek 2013). Hajek (2013) applies a vector autoregression model to explore the endogeneity issue in his research on life satisfaction using the *German Socio-Economic Panel (SOEP)* time period 1998-2009. The results show that an increase in life satisfaction can affect individuals' income and health positively. Similar conclusions are also drawn by Graham, Eggers, and Sukhtankar (2004), who conduct analysis based on panel data from the *Russia Longitudinal Monitoring Survey (RLMS)* for 1992 to 2001. Graham et al. (2004) argue that individuals who are happier should have a higher probability of increasing their future income; simultaneously, income may play an important role in affecting people's happiness as well. Additionally, divorce has negative effects on happiness, and people who are unhappier are more likely to get divorced.

3. Data and descriptive statistics

This section describes the source of the data utilized and compares the trends in the data. The research is based on the *2006 General Social Survey (GSS) Cycle 20*, *2011 General Social Survey (GSS) Cycle 25* and *2016 General Social Survey (GSS) Cycle 30* released by Statistics Canada, of which the themes are: *Family Transitions*, *Family* and *Canadians at Work and Home* respectively. The GSS incorporates a significant number of socioeconomic indicators which are relevant to the research objective of this paper. The targeted population of the three surveys above includes all non-institutionalized persons living in Canada aged 15 years or above, excluding the Yukon, Northwest Territories, and Nunavut. Lastly, the GSS collected feedback from 23,608 respondents in 2006, 22,435 respondents in 2011, and 19,609 respondents in 2016. After the removal of all missing or invalid records, the sample size for this analysis is 17,735 in 2006, 17,399 in 2011 and 18,868 in 2016. One interesting fact is that the original number of observations in the 2016 dataset is the smallest, while the count of the records in 2016 after data cleaning is the largest, implying that the proportion of invalid records of the survey is getting smaller and respondents may be more willing to contribute their private information to social investigation, especially their household income information (5,333 invalid records in 2006, 4,406 invalid records in 2011 and 0 invalid records in 2016.)

3.1. Descriptive statistics of happiness

Happiness is the dependent variable of this empirical study, which is measured by the survey question: “How do you feel about your life as a whole?”. The respondents are given a scale of 1 to 10 in the 2006 survey, but given a scale of 0 to 10 in the 2011 and 2016 surveys, where 0 (or 1) means “very dissatisfied” and 10 means “very satisfied.” Table 1 presents the frequency distribution, mean, and standard deviation of happiness across the three years. This paper cleaned the data by combining the responses 0, 1, 2, 3 into one group because of three concerns. Firstly, there exists an overlapping issue with respect to the cut point of the first four levels in 2016 after running the ordered probit model (which will be elaborated on in Sections 4 and 5). Secondly, grouping the first three or four levels can fix an imbalance in the data, as only a small proportion of respondents rated their life satisfaction as lying between 0 (or 1) and 3. Thirdly, it will be easier to do comparisons across the three years if the data ranges are consistent.

As Table 1 shows, the mean of level of happiness is stable around a level of 8 (mean is 7.961 in 2006, 8.121 in 2011 and 7.890 in 2016 respectively). In addition, the proportion of those who are very satisfied with their own life fluctuated around 20%. Lastly, over half of the sample is below the mean level of life satisfaction.

Table 1. Frequency Distribution of Happiness

| Level of happiness | 2006 | | | 2011 | | | 2016 | | |
|--------------------|---------------|---------|--------|---------------|---------|--------|---------------|---------|--------|
| | Freq. | Percent | Cum. | Freq. | Percent | Cum. | Freq. | Percent | Cum. |
| 3 | 384 | 2.17 | 2.17 | 320 | 1.84 | 1.84 | 454 | 2.41 | 2.41 |
| 4 | 244 | 1.38 | 3.54 | 166 | 0.95 | 2.79 | 277 | 1.47 | 3.87 |
| 5 | 923 | 5.20 | 8.75 | 843 | 4.85 | 7.64 | 991 | 5.25 | 9.13 |
| 6 | 1,027 | 5.79 | 14.54 | 850 | 4.89 | 12.52 | 1,157 | 6.13 | 15.26 |
| 7 | 2,879 | 16.23 | 30.77 | 2,556 | 14.69 | 27.21 | 3,327 | 17.63 | 32.89 |
| 8 | 5,528 | 31.17 | 61.94 | 5,490 | 31.55 | 58.77 | 6,091 | 32.28 | 65.17 |
| 9 | 3,592 | 20.25 | 82.19 | 3,198 | 18.38 | 77.15 | 3,230 | 17.12 | 82.29 |
| 10 | 3,158 | 17.81 | 100.00 | 3,976 | 22.85 | 100.00 | 3,341 | 17.71 | 100.00 |
| Obs. | 17,735 | | | 17,399 | | | 18,868 | | |
| Mean (Std.) | 7.961 (1.593) | | | 8.121 (1.573) | | | 7.890 (1.612) | | |

NOTE: Individuals are happier as the level of happiness increases.

3.2. Descriptive statistics of determinants of happiness

The explanatory variables can be divided into two categories: individual characteristics (gender, age, birthplace, marital status, number of children living in the household, health status and religious status) and socioeconomic characteristics (educational attainment, rural/urban indicator, province, annual household income and main activity in the last 12 months.)

Table 2 presents the gender ratio of the sample, and the average happiness across genders. The percentage of female respondents is always about 10 points higher than that of male respondents. The mean level of happiness of females is higher than that of males in 2011 and 2016; in 2006, males are slightly happier than females overall.

Table 3 shows the frequency distribution of ages and the average happiness level across each age group. The frequency distribution implies that the proportion of middle-aged groups varies slightly during this period, from 37.35% in 2006, to 40.62% in 2011 and back to 36.76% in 2016.³ However, the proportion of younger groups experiences a dramatic decrease from 47.32% in 2006 to 34.38% in 2016, while the proportion of older groups increases from 15.33% in 2006

³ According to the Merriam-Webster Dictionary, middle age is between 45 and 64.

to 28.85% in 2016. The mean level of happiness of the elderly cohort is always the highest among all the age groups, and the overall change in the level of happiness tends to be like a “U shape” as the age increases in all the three years.

According to Table 4, the percentage of respondents who are born in Canada is overwhelmingly higher than those who are born out of Canada, while the difference in the level of happiness between those two groups is small.

The frequency distribution of respondents’ marital status can be found in Table 5. About half of the respondents are married, and approximately 20% are single. The mean level of happiness of those who are in a partnership (married or living common-law) is higher than that of other groups. Those respondents who are separated are the least satisfied with their life.

Table 6 presents the frequency distribution of the number of children living in a household. Most respondents have no children living with them -- 64.43% in 2006, 66.85% in 2011 and 72.55% in 2016. Respondents who have more children living in the household seem to be happier than those having fewer or no children living with them.

Table 2. Frequency Distribution of Gender and Mean Happiness of Each Category

| Gender | 2006 | | | 2011 | | | 2016 | | |
|---------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Female | 9,633 | 54.32 | 7.956 | 9,491 | 54.55 | 8.141 | 10,440 | 55.33 | 7.929 |
| Male | 8,102 | 45.68 | 7.967 | 7,908 | 45.45 | 8.097 | 8,428 | 44.67 | 7.841 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 3. Frequency Distribution of Age and Mean Happiness of Each Category

| Age | 2006 | | | 2011 | | | 2016 | | |
|-----------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| 15 to 24 | 1,645 | 9.28 | 8.121 | 1,244 | 7.15 | 8.209 | 1,369 | 7.26 | 7.963 |
| 25 to 34 | 2,954 | 16.66 | 7.996 | 2,212 | 12.71 | 8.113 | 2,309 | 12.24 | 7.757 |
| 35 to 44 | 3,794 | 21.39 | 7.804 | 2,923 | 16.80 | 8.031 | 2,809 | 14.89 | 7.713 |
| 45 to 54 | 3,577 | 20.17 | 7.802 | 3,485 | 20.03 | 7.926 | 3,014 | 15.97 | 7.667 |
| 55 to 64 | 3,046 | 17.18 | 8.019 | 3,583 | 20.59 | 8.082 | 3,923 | 20.79 | 7.858 |
| 65 to 74 | 1,713 | 9.66 | 8.233 | 2,378 | 13.67 | 8.309 | 3,328 | 17.64 | 8.117 |
| Above 75 | 1,006 | 5.67 | 8.119 | 1,574 | 9.05 | 8.461 | 2,116 | 11.21 | 8.241 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 4. Frequency Distribution of Birthplace and Mean Happiness of Each Category

| Birthplace | 2006 | | | 2011 | | | 2016 | | |
|----------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Canada | 14,933 | 84.20 | 7.998 | 14,631 | 84.09 | 8.135 | 15,214 | 80.63 | 7.870 |
| Out of Canada | 2,802 | 15.80 | 7.766 | 2,786 | 15.91 | 8.045 | 3,654 | 19.37 | 7.973 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 5. Frequency Distribution of Marital Status and Mean Happiness of Each Category

| Marital status | 2006 | | | 2011 | | | 2016 | | |
|-------------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Married | 8,683 | 48.96 | 8.217 | 8,670 | 49.83 | 8.438 | 9,085 | 48.15 | 8.131 |
| Living common-law | 1,810 | 10.21 | 8.065 | 1,834 | 10.54 | 8.162 | 1,712 | 9.07 | 7.921 |
| Widowed | 1,144 | 6.45 | 7.887 | 1,529 | 8.79 | 8.146 | 1,717 | 9.10 | 7.955 |
| Separated | 675 | 3.81 | 7.215 | 546 | 3.14 | 7.159 | 605 | 3.21 | 7.322 |
| Divorced | 1,531 | 8.63 | 7.428 | 1,490 | 8.56 | 7.513 | 1,601 | 8.49 | 7.539 |
| Single (Never married) | 3,892 | 21.95 | 7.702 | 3,330 | 19.14 | 7.689 | 4,148 | 21.98 | 7.539 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 6. Frequency Distribution of Number of Children and Mean Happiness of Each Category

| Number of children | 2006 | | | 2011 | | | 2016 | | |
|------------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| None | 11,427 | 64.43 | 7.964 | 11,585 | 66.58 | 8.094 | 13,689 | 72.55 | 7.898 |
| One child | 2,694 | 15.19 | 7.896 | 2,498 | 14.36 | 8.109 | 2,472 | 13.10 | 7.845 |
| Two children | 2,595 | 14.63 | 7.994 | 2,402 | 13.81 | 8.200 | 2,042 | 10.82 | 7.846 |
| Three children | 792 | 4.47 | 7.992 | 712 | 4.09 | 8.267 | 545 | 2.89 | 8.004 |
| Four or more children | 227 | 1.28 | 8.106 | 202 | 1.16 | 8.361 | 120 | 0.64 | 8.058 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

In addition to happiness, there is another variable measuring health status, which is based on respondents' subjective evaluations. Respondents were asked "In general, would you say your health is:" in the survey, and they are expected to reply using a scale of 1 to 5, where 1 means "excellent" and 5 means "poor". Table 7 shows that approximately 85% of the respondents think their health status is "good" or above ("excellent", "very good" or "good"), and there seems to exist a positive relationship between health status and happiness. However, the proportion of those who think their health is excellent has declined dramatically, which may be due to the increase in the proportion of elderly people.

Unfortunately, the questions related to religion are different in 2016 as compared to 2006 and 2011. The 2016 GSS utilizes a "religious affiliation flag" to indicate people who have a religious affiliation, while in 2006 and 2011 respondents are expected to choose from "categories of religions" including Roman Catholic, United Church, Protestant, other regions, para-religious groups or unknown and no religion. To facilitate comparisons, this paper transforms the variable to a dummy variable (having religion or not having religion) as indicated in Table 8. In other words, I merge those respondents in 2006 or 2011 who select a religion in one group, no matter what kind of religion they believe in. People who have a religion seem to be happier on average than those who have no religion.

Tables 9 and 10 illustrate the frequency distribution of respondents' geographic locations: province and a rural/urban index. Although the majority of respondents live in Ontario, Quebec or British Columbia, the proportions have gradually decreased during the 10-year period. The trend is for residents of Canada to move to larger urban centers. However, respondents living in rural areas appear to be happier on average than those living in big cities.

Table 7. Frequency Distribution of Health Status and Mean Happiness of Each Category

| Health status | 2006 | | | 2011 | | | 2016 | | |
|------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Excellent | 4,100 | 23.12 | 8.660 | 3,586 | 20.61 | 8.773 | 2,620 | 13.89 | 8.593 |
| Very good | 6,074 | 34.25 | 8.194 | 6,070 | 34.89 | 8.388 | 6,826 | 36.18 | 8.227 |
| Good | 4,986 | 28.11 | 7.755 | 5,085 | 29.23 | 7.877 | 6,615 | 35.06 | 7.692 |
| Fair | 1,944 | 10.96 | 6.985 | 1,914 | 11.00 | 7.301 | 2,222 | 11.78 | 7.101 |
| Poor | 631 | 3.56 | 5.815 | 744 | 4.28 | 6.577 | 585 | 3.10 | 6.038 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 8. Frequency Distribution of Religious Status and Mean Happiness of Each Category

| Religious status | 2006 | | | 2011 | | | 2016 | | |
|----------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Having religion | 14,333 | 80.82 | 7.992 | 13,918 | 79.99 | 8.164 | 15,037 | 79.70 | 7.964 |
| Not having religion | 3,402 | 19.18 | 7.830 | 3,481 | 20.01 | 7.947 | 3,831 | 20.30 | 7.599 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 9. Frequency Distribution of Province and Mean Happiness of Each Category

| Province | 2006 | | | 2011 | | | 2016 | | |
|--------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| NL | 965 | 5.44 | 8.150 | 876 | 5.03 | 8.197 | 1,263 | 6.69 | 8.036 |
| PE | 534 | 3.01 | 8.099 | 499 | 2.87 | 8.289 | 603 | 3.20 | 8.101 |
| NS | 1,052 | 5.93 | 7.972 | 946 | 5.44 | 8.041 | 1,215 | 6.44 | 7.927 |
| NB | 946 | 5.33 | 8.050 | 900 | 5.17 | 8.287 | 1,246 | 6.60 | 7.979 |
| QC | 3,483 | 19.64 | 7.999 | 3,268 | 18.78 | 8.044 | 3,063 | 16.23 | 7.881 |
| ON | 5,435 | 30.65 | 7.872 | 4,634 | 26.63 | 8.071 | 4,897 | 25.95 | 7.793 |
| MB | 959 | 5.41 | 7.987 | 944 | 5.43 | 8.806 | 1,211 | 6.42 | 8.036 |
| SK | 836 | 4.71 | 7.972 | 1,041 | 5.98 | 8.227 | 1,305 | 6.92 | 7.992 |
| AB | 1,518 | 8.56 | 7.945 | 2,264 | 13.01 | 8.209 | 1,671 | 8.86 | 7.826 |
| BC | 2,007 | 11.32 | 7.954 | 2,027 | 11.65 | 8.111 | 2,394 | 12.69 | 7.819 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 10. Frequency Distribution of Rural/urban Index and Mean Happiness of Each Category

| Rural/Urban | 2006 | | | 2011 | | | 2016 | | |
|-----------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Larger urban centers | 9,015 | 50.83 | 7.884 | 12,849 | 73.85 | 8.087 | 14,829 | 78.59 | 7.825 |
| Rural and small town | 1,910 | 10.77 | 8.134 | 4,051 | 23.28 | 8.206 | 3,436 | 18.21 | 8.133 |
| Other provinces (PE) | 6,810 | 38.40 | 8.014 | 499 | 2.87 | 8.289 | 603 | 3.20 | 8.101 |
| Total | 17,735 | 100.00 | 7.962 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Unfortunately, educational attainment is categorized differently in the three datasets. Thus, I make some adjustments to group the educational levels in the manner shown in Table 11. The overall educational level of the respondents indicates an upward trend; the proportion of those with a degree above bachelor increases, while that of respondents with a qualification below high school decreases. The level of happiness might be not significantly different among people with different levels of educational attainment.

Similar to educational attainment, the annual household income classes are different across surveys. As a result, some adjustments have been made. It can be seen from Table 12 that there exists an upward trend in the overall household income, which may be partly due to inflation; the proportion of respondents whose household income is more than \$100,000 is increasing, while the proportion of those with household income less than \$50,000 is decreasing. In general, it can be basically acknowledged that on average, the higher the annual household income, the happier the respondent.

In Table 13, I present the frequency distribution of respondents' main activity, as well as the mean level of happiness for each category. It is shown that most respondents have a paid job - 61.63% in 2006, 56.97% in 2011 and 53.49% in 2016 respectively. The next largest category is those who have retired, which accounts for 18.04% in 2006, 24.69% in 2011 and 29.42% in 2016. This change can be explained properly by the change in the age distribution observed in Table 3. The proportions of other main activities are all below 7% respectively. Not surprisingly, the happiness level of those who are looking for paid work or have a long-term illness is lower than average.

Table 11. Frequency Distribution of Educational Attainment and Mean Happiness of Each Category

| Educational attainment | 2006 | | | 2011 | | | 2016 | | |
|--------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Above bachelor | 1,230 | 6.94 | 8.106 | 1,184 | 6.80 | 8.444 | 1,774 | 9.40 | 7.892 |
| Bachelor | 3,160 | 17.82 | 7.997 | 3,105 | 17.85 | 8.301 | 3,389 | 17.96 | 7.804 |
| Diploma | 5,233 | 29.51 | 7.924 | 5,046 | 29.00 | 8.097 | 6,407 | 33.96 | 7.856 |
| High school | 5,088 | 28.69 | 7.933 | 5,045 | 29.00 | 8.039 | 4,602 | 24.39 | 7.882 |
| Below high school | 3,024 | 17.05 | 7.977 | 3,019 | 17.35 | 7.985 | 2,696 | 14.29 | 8.089 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

NOTES: The variable “Diploma” includes the individuals whose educational attainment is trade certificate or diploma, college/CEGEP/other non-university certificate or diploma and university certificate or diploma below the bachelor’s level. The variable “High School” includes the individuals whose educational attainments is high school diploma, some trade/technical, some college or some university.

Table 12. Frequency Distribution of Household Income and Mean Happiness of Each Category

| Household income | 2006 | | | 2011 | | | 2016 | | |
|------------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Below \$50,000 | 7,972 | 44.95 | 7.731 | 6,857 | 37.86 | 7.748 | 6,105 | 32.36 | 7.673 |
| \$50,000 to \$100,000 | 6,400 | 36.09 | 8.073 | 5,911 | 33.97 | 8.204 | 6,262 | 33.19 | 7.935 |
| Above \$100,000 | 3,363 | 18.96 | 8.294 | 4,901 | 28.17 | 8.523 | 6,501 | 34.46 | 8.050 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

Table 13. Frequency Distribution of Main Activity and Mean Happiness of Each Category

| Main activity | 2006 | | | 2011 | | | 2016 | | |
|--------------------------------------|--------|---------|----------------|--------|---------|----------------|--------|---------|----------------|
| | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness | Freq. | Percent | Mean happiness |
| Having a paid job | 10,842 | 61.13 | 7.984 | 9,912 | 56.97 | 8.135 | 10,092 | 53.49 | 7.818 |
| Looking for paid work | 255 | 1.44 | 7.173 | 324 | 1.86 | 6.830 | 297 | 1.57 | 6.801 |
| Going to school | 1,230 | 6.94 | 8.095 | 1,041 | 5.98 | 8.186 | 1,192 | 6.32 | 7.930 |
| Caring for children/housework | 1,506 | 8.49 | 7.990 | 1,137 | 6.53 | 8.147 | 781 | 4.14 | 8.122 |
| Retired | 3,200 | 18.04 | 8.163 | 4,296 | 24.69 | 8.348 | 5,551 | 29.42 | 8.139 |
| Maternity/paternity leave | 50 | 0.28 | 8.340 | 43 | 0.25 | 8.465 | 119 | 0.63 | 8.202 |
| Long term illness | 448 | 2.53 | 6.036 | 507 | 2.91 | 6.592 | 592 | 3.14 | 6.289 |
| Other unpaid | 204 | 1.15 | 7.691 | 139 | 0.80 | 7.871 | 244 | 1.29 | 8.053 |
| Total | 17,735 | 100.00 | 7.961 | 17,399 | 100.00 | 8.121 | 18,868 | 100.00 | 7.890 |

4. Econometric model

To analyze the factors associated with the subjective assessment of people's happiness, the ordered probit method is widely utilized (e.g., Meer and Wielers 2011; Elmslie and Tebaldi 2014), while the linear regression model is also employed by previous studies (e.g., Bonikowska et al. 2014; Cheng and Smyth 2015). Bonikowska et al. (2014) find that the results of the above two common models are consistent with each other when the same set of attributes is incorporated. As the dependent variable "happiness" is measured by the level of life satisfaction in the GSS, which has been converted to an eight-point discrete variable, the ordered probit model is presented in this paper.

4.1. Ordered probit model

In practice, a dependent variable sometimes can be a discrete indicator to represent a pair or even a set of choices, rather than a continuous quantitative indicator of some economic outcome. These kinds of cases can occur in fields like purchasing decisions, responses to survey questions about self-assessed health status or job satisfaction, and so on. Greene (2012) divides these discrete choices into four categories based on the characteristics of the choices: (1) Binary Choice, where the individual needs to make a choice between two options, consistent with his/her actual situation or to maximize his/her utility; (2) Multinomial Choice, where the individual must choose the option which yields the greatest utility from more than two alternatives; (3) Ordered Choice, in which options are assigned sequenced numerical values indicating the strength of the corresponding option; and (4) Event Counts, which represent the frequency of the occurrence of a specific event.

Greene (2012) proposes different regression methodologies for the different situations above; the ordered probit model is recommended for category (3). As the dependent variable "happiness" in this paper is an ordered choice variable, the ordered probit model is utilized.

This paper assumes there exists an unobserved latent variable U_i^* affecting people's happiness rating, ranging over the entire real line: $-\infty < U_i^* < +\infty$, where i indicates the corresponding individual. As mentioned above, respondents are asked to assess their overall feeling about life using an integer scale from 3 to 10. Thus, the ranking can be transformed as:

$$\begin{aligned}
Happiness_i &= 3 \text{ if } -\infty < U_i^* \leq \mu_3, \\
Happiness_i &= 4 \text{ if } \mu_3 < U_i^* \leq \mu_4, \\
Happiness_i &= 5 \text{ if } \mu_4 < U_i^* \leq \mu_5, \\
&\vdots \\
Happiness_i &= 10 \text{ if } \mu_9 < U_i^* \leq +\infty.
\end{aligned} \tag{1}$$

Obviously, the discrete variable “ $Happiness_i$ ” is still constructed based on the continuous range of individuals’ utility U_i^* . Note that the threshold μ_j plays a critical role in the overall model, as it helps to divide the infinite range of utility into eight sections which correspond to the eight observed outcomes. Compared with the linear regression model, the numerical value assigned to the dependent variable is no longer a quantitative value, rather only a ranking. For example, “4” being greater than “3” should be interpreted as “the individual’s level of happiness with ‘4’ is higher than that with ‘3’”, not as “the individual’s level of happiness with ‘4’ is one unit higher than that with ‘3’.” The difference between a “4” and a “3” is different from that between a “5” and a “4”.

Since the objective of this paper is to investigate the determinants of happiness, a connection between happiness and those potential determinants must be reflected in the econometric model. The connection should be the latent variable U_i^* , which can also be interpreted as the individual’s utility. Although the relationship between an individual’s utility and their specific characteristics is uncertain, it is common to employ a linear random utility function:

$$U_i^* = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik} + \varepsilon_i, \tag{2}$$

where $x_{i1}, x_{i2}, \dots, x_{ik}$ denote individual i ’s characteristics, which are potential determinants of happiness such as gender, age, marital status, health status, educational attainment and so on. Other unobservable factors are captured by ε_i .

For simplicity, this equation can be also written in matrix format as:

$$U_i^* = \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i, \tag{3}$$

where the vector \mathbf{x}'_i contains all individual i ’s characteristics. Thus, the ranking (1) becomes:

$$\begin{aligned}
Happiness_i &= 3 \text{ if } -\infty < \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i \leq \mu_3, \\
Happiness_i &= 4 \text{ if } \mu_3 < \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i \leq \mu_4, \\
Happiness_i &= 5 \text{ if } \mu_4 < \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i \leq \mu_5, \\
&\vdots \\
&21
\end{aligned} \tag{4}$$

$$Happiness_i = 10 \text{ if } \mu_9 < \mathbf{x}'_i \boldsymbol{\beta} + \varepsilon_i \leq +\infty.$$

Another assumption made in this paper is that the random term ε is normally distributed. Following Greene (2012), probability equations are derived as follows:

$$\begin{aligned} Prob(Happiness_i = 3 | \mathbf{x}_i) &= \Phi(\mu_3 - \mathbf{x}'_i \boldsymbol{\beta}), \\ Prob(Happiness_i = 4 | \mathbf{x}_i) &= \Phi(\mu_4 - \mathbf{x}'_i \boldsymbol{\beta}) - \Phi(\mu_3 - \mathbf{x}'_i \boldsymbol{\beta}), \\ Prob(Happiness_i = 5 | \mathbf{x}_i) &= \Phi(\mu_5 - \mathbf{x}'_i \boldsymbol{\beta}) - \Phi(\mu_4 - \mathbf{x}'_i \boldsymbol{\beta}), \\ &\vdots \\ Prob(Happiness_i = 10 | \mathbf{x}_i) &= 1 - \Phi(\mu_9 - \mathbf{x}'_i \boldsymbol{\beta}). \end{aligned} \quad (5)$$

To make all the probabilities above positive, we must ensure that

$$\mu_3 < \mu_4 < \mu_5 < \dots < \mu_9. \quad (6)$$

$\mu_3, \mu_4, \mu_5, \dots, \mu_9$ are the cut points in the ordered probit model and are estimated together with the vector $\boldsymbol{\beta}$.

4.2. Marginal effects

The ordered probit model is a nonlinear model and the numerical value of the dependent value only provides a ranking; thus, the estimated coefficients cannot be interpreted in the same way as in the classical linear regression model. As a result, the marginal effect is introduced as a better solution to interpret the coefficient estimates. Cameron and Trivedi (2009) provide us with three types of marginal effect: (1) Average Marginal Effect (AME), which is derived by calculating the average of the marginal effects of each independent variable for each observation; (2) Marginal Effect at the Mean (MEM), which is derived by setting all the independent variables equal to their sample mean values and (3) Marginal Effects at Representative Value (MER), for which a representative value is chosen for each independent variable when computing marginal effects.

Since all the independent variables in this paper are dummy variables, which means that the mean of all the observations for each variable can only indicate the proportion of observations with that characteristic, rather than a meaningful measurement, the AME is preferred when calculating marginal effects in this paper.

4.3. Variable definitions

In Section 3, descriptive statistics for “Happiness” and each potential determinant have been presented. A few determinants are presented as the original variable type, such as gender; some

determinants are converted to groups of dummy variables, such as age and educational attainment; and the rest are manually converted to dummy variables based on their definition, such as marital status and children. Hence all the explanatory variables in the final model are dummy variables.

Table 14 presents how each explanatory variable is defined in detail.

Table 14. Definition of Explanatory Variables

| Determinant | Explanatory variable | Description |
|---------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------|
| Gender | female | female=1 if the respondent is female, otherwise 0 |
| Age | age1524 | age1524=1 if the respondent's age is between 15 and 24, otherwise 0 |
| | age2534 | age2534=1 if the respondent's age is between 25 and 34, otherwise 0 |
| | age3544 | age3544=1 if the respondent's age is between 35 and 44, otherwise 0 |
| | age4554* | age4554=1 if the respondent's age is between 45 and 54, otherwise 0 |
| | age5564 | age5564=1 if the respondent's age is between 55 and 64, otherwise 0 |
| | ageabove65 | ageabove65=1 if the respondent's age is above 65, otherwise 0 |
| Birthplace | Canada | Canada=1 if the respondent was born in Canada, otherwise 0 |
| Marital status | partner | partner=1 if the respondent's marital status is "married" or "living common-law", otherwise 0 |
| Number of children | no children* | no children=1 if there are no children living in the respondent's household, otherwise 0 |
| | one child | one child=1 if there are one child living in the respondent's household, otherwise 0 |
| | two children | two children=1 if there are two children living in the respondent's household, otherwise 0 |
| | three children | three children=1 if there are three children living in the respondent's household, otherwise 0 |
| | more children | more children=1 if there are four or more children living in the respondent's household, otherwise 0 |
| Health status | good health | good health=1 if the respondent's self-rated health status is excellent, very good or good, otherwise 0 |
| Religious status | religion | religion=1 if the respondent has at least one religion, otherwise 0 |

| Determinant | Explanatory variable | Description |
|-------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Province | NL | NL=1 if the respondent is living in Newfoundland and Labrador, otherwise 0 |
| | PE | PE=1 if the respondent is living in Prince Edward Island, otherwise 0 |
| | NS | NS=1 if the respondent is living in Nova Scotia, otherwise 0 |
| | NB | NB=1 if the respondent is living in New Brunswick, otherwise 0 |
| | QC | QC=1 if the respondent is living in Quebec, otherwise 0 |
| | ON* | ON=1 if the respondent is living in Ontario, otherwise 0 |
| | MB | MB=1 if the respondent is living in Manitoba, otherwise 0 |
| | SK | SK=1 if the respondent is living in Saskatchewan, otherwise 0 |
| | AB | AB=1 if the respondent is living in Alberta, otherwise 0 |
| | BC | BC=1 if the respondent is living in British Columbia, otherwise 0 |
| Rural/urban | large urban | large urban=1 if the respondent is living in a larger urban center, otherwise 0 |
| Educational attainment | below high school | below high school=1 if the respondent's highest degree is below high school or no schooling, otherwise 0 |
| | high school* | high school=1 if the respondent's highest degree is high school, some trade/technical, some community college/CEGEP/nursing or some university, otherwise 0 |
| | diploma | diploma=1 if the respondent's highest degree is diploma/certificate from trade/technical or diploma/certificate from community college/university, otherwise 0 |
| | bachelor | bachelor=1 if the respondent's highest degree is bachelor's degree, otherwise 0 |
| | above bachelor | above bachelor=1 if the respondent's highest degree is above bachelor's, otherwise 0 |

| Determinant | Explanatory variable | Description |
|-------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Household income | below 50k* | below 50k=1 if the respondent's annual household income is below \$50,000, otherwise 0 |
| | 50k to 100k | 50k to 100k=1 if the respondent's annual household income is between \$50,000 and \$100,000, otherwise 0 |
| | above 100k | above 100k=1 if the respondent's annual household income is above \$100,000, otherwise 0 |
| Main activity | work* | work=1 if the respondent had paid work or was self-employed in the last 12 months, otherwise 0 |
| | education | education=1 if the respondent was in school in the last 12 months, otherwise 0 |
| | unemployed | unemployed=1 if the respondent was unemployed but looking for a paid job in the last 12 months, otherwise 0 |
| | retired | retired=1 if the respondent was retired in the last 12 months, otherwise 0 |
| | child or housework | child or housework=1 if the respondent was caring for children or doing household work in the last 12 months, otherwise 0 |
| | mpleave | mpleave=1 if the respondent was on a maternity/paternity leave in the last 12 months, otherwise 0 |
| | illness | illness=1 if the respondent had a long-term illness in the last 12 months, otherwise 0 |
| | unpaid | unpaid=1 if the respondent was volunteering/care-giving other than for children, or in other unpaid situations, otherwise 0 |

NOTE: An asterisk indicates that this group is the reference group.

Other than the variables defined above, there are many other variables affecting individuals' happiness that are not incorporated in the model. These omitted variables may lead to the problem of endogeneity. For example, whether the respondent is disabled or not can play an important role in both happiness and health status. The level of a respondent's intelligence quotient can affect his/her happiness, educational attainment and even his/her household income. Additionally, another cause for endogeneity that should be taken into consideration when investigating the determinants of happiness is simultaneity. It is characterized by the interplay between the dependent variable and one or more independent variables. For instance, are respondents who are married are happier, or are happier individuals more likely to get married? Are people with higher levels of educational attainment likely to be happier, or are happier individuals more likely to pursue a higher degree? Does a respondent with higher income feel happier, or do happier people tend to make more money? Although these potential questions may lead to the problem of endogeneity, due to a lack of panel data this paper can not resolve the endogeneity problem.

5. Results and discussion

As discussed in previous sections, the range of values of the variable *happiness* varies across the three datasets. It ranges from 1 to 10 in the 2006 dataset, while the lower bound is 0 in the 2011 and 2016 datasets. Table 15 presents the estimated coefficients of the threshold parameters and the corresponding 95% confidence intervals for each threshold when the original ten- or eleven-point scales are used. In the 2006 dataset, there is no overlap between the confidence intervals of each threshold. However, in the 2011 and 2016 datasets, issues of overlapping have been detected. For instance, the confidence intervals for Cut 1, Cut 2, Cut 3 and Cut 4 overlap with each other, suggesting that there should be fewer levels of happiness in 2016. However, comparisons between the three datasets will be clearer when the ranges of the dependent variable are identical. To resolve this issue, this paper has combined happiness ratings of 1, 2, 3 into one group for the 2006 dataset, and has merged the responses 0, 1, 2, 3 together for the 2011 and 2016 datasets. Thus, the range of the dependent variable has become consistent through all the datasets, from 3, 4, 5 up to 10. Note that, based on the assumptions and properties of the ordered probit model, there is no difference whether I set the range of the dependent variable from 3 to 10 or from 1 to 8. The numerical values of the cut points only represent a ranking, and should have no impact on the interpretation of the regression results.

Table 16 contains the coefficient estimates of the ordered probit model for the three years. Firstly, the estimated coefficients of all the thresholds are different from each other for each year, and the 95% confidence intervals for each threshold do not overlap, which suggests that the eight levels of happiness after adjustment are now distinct and do not need any further combination. In addition, the likelihood ratio statistics of 3014.75 in 2006, 2890.49 in 2011 and 2757.36 in 2016 with 0.000 p-values for each one demonstrate that the null hypothesis that all the coefficients of the independent variables are zero simultaneously is rejected.

Table 15. Estimates of the Threshold Parameter When Ten- or Eleven Point Scales Are Used

| Cuts | 2006 | | | 2011 | | | 2016 | | |
|---------------|-------------------|----------------------|--------|-------------------|----------------------|--------|-------------------|----------------------|--------|
| | Coef. (S.D.) | [95% Conf. Interval] | | Coef. (S.D.) | [95% Conf. Interval] | | Coef. (S.D.) | [95% Conf. Interval] | |
| Cut 1 | -1.510 (0.059) | -1.625 | -1.395 | -1.467 (0.058) | -1.580 | -1.354 | -1.889 (0.059) | -2.005 | -1.773 |
| Cut 2 | -1.287 (0.055) | -1.395 | -1.179 | -1.363 (0.056) | -1.472 | -1.254 | -1.720 (0.056) | -1.829 | -1.610 |
| Cut 3 | -1.015 (0.053) | -1.118 | -0.912 | -1.186 (0.053) | -1.289 | -1.082 | -1.495 (0.052) | -1.598 | -1.392 |
| Cut 4 | -0.764 (0.051) | -0.864 | -0.663 | -1.023 (0.051) | -1.123 | -0.922 | -1.218 (0.050) | -1.317 | -1.120 |
| Cut 5 | -0.233 (0.050) | -0.331 | -0.135 | -0.814 (0.050) | -0.912 | -0.716 | -0.978 (0.049) | -1.074 | -0.882 |
| Cut 6 | 0.115 (0.050) | 0.018 | 0.213 | -0.247 (0.048) | -0.342 | -0.153 | -0.489 (0.048) | -0.583 | -0.395 |
| Cut 7 | 0.741 (0.050) | 0.643 | 0.839 | 0.078 (0.048) | -0.016 | 0.172 | -0.146 (0.048) | -0.240 | -0.053 |
| Cut 8 | 1.620 (0.050) | 1.521 | 1.720 | 0.693 (0.048) | 0.598 | 0.787 | 0.494 (0.048) | 0.401 | 0.588 |
| Cut 9 | 2.276 (0.051) | 2.176 | 2.377 | 1.600 (0.049) | 1.503 | 1.695 | 1.392 (0.048) | 1.298 | 1.487 |
| Cut 10 | - | - | - | 2.154 (0.049) | 2.057 | 2.251 | 1.960 (0.049) | 1.864 | 2.056 |

Table 16. Results of Ordered Probit Model

| Variables | 2006 | | 2011 | | 2016 | |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| Gender | | | | | | |
| female | 0.057*** | 0.017 | 0.114*** | 0.017 | 0.080*** | 0.016 |
| Age | | | | | | |
| age1524 | 0.195*** | 0.039 | 0.302*** | 0.046 | 0.277*** | 0.047 |
| age2534 | 0.059** | 0.027 | 0.058** | 0.029 | 0.061** | 0.030 |
| age3544 | -0.061** | 0.025 | -0.020 | 0.027 | 0.002 | 0.028 |
| age5564 | 0.179*** | 0.028 | 0.145*** | 0.027 | 0.123*** | 0.027 |
| ageabove65 | 0.357*** | 0.038 | 0.431*** | 0.035 | 0.324*** | 0.033 |
| Birthplace | | | | | | |
| Canada | 0.134*** | 0.023 | 0.059*** | 0.023 | -0.161*** | 0.021 |
| Marital Status | | | | | | |
| partner | 0.357*** | 0.019 | 0.384*** | 0.020 | 0.277*** | 0.019 |
| Number of children | | | | | | |
| one child | -0.071*** | 0.024 | -0.034 | 0.025 | -0.075*** | 0.024 |
| two children | -0.065** | 0.026 | -0.033 | 0.028 | -0.077*** | 0.029 |
| three children | -0.089** | 0.041 | 0.030 | 0.044 | -0.004 | 0.048 |
| more children | 0.014 | 0.072 | 0.090 | 0.077 | 0.001 | 0.098 |
| Health status | | | | | | |
| good health | 0.879*** | 0.024 | 0.661*** | 0.024 | 0.720*** | 0.022 |
| Religious status | | | | | | |
| religion | 0.081*** | 0.021 | 0.113*** | 0.021 | 0.161*** | 0.020 |
| Province | | | | | | |
| NL | 0.081* | 0.043 | 0.074* | 0.040 | 0.165*** | 0.034 |
| PE | -0.018 | 0.052 | 0.084 | 0.052 | 0.118** | 0.049 |
| NS | -0.050 | 0.042 | 0.028 | 0.038 | 0.119*** | 0.034 |
| NB | 0.049 | 0.043 | 0.183*** | 0.039 | 0.169*** | 0.034 |
| QC | 0.070*** | 0.023 | -0.018 | 0.025 | 0.038 | 0.024 |
| MB | -0.048 | 0.043 | 0.026 | 0.038 | 0.157*** | 0.034 |
| SK | -0.088** | 0.045 | 0.063* | 0.037 | 0.127*** | 0.033 |
| AB | -0.105*** | 0.038 | 0.056** | 0.027 | 0.043 | 0.030 |
| BC | 0.082*** | 0.028 | 0.058** | 0.028 | 0.048* | 0.026 |
| Rural/urban | | | | | | |
| large urban | -0.148*** | 0.027 | -0.089*** | 0.020 | -0.144*** | 0.021 |
| Educational attainment | | | | | | |
| above bachelor | -0.031 | 0.034 | 0.132*** | 0.035 | -0.101*** | 0.030 |
| bachelor | -0.074*** | 0.025 | 0.049* | 0.025 | -0.137*** | 0.025 |
| diploma | -0.038* | 0.021 | 0.009 | 0.021 | -0.046** | 0.021 |
| below high school | 0.104*** | 0.025 | 0.025 | 0.025 | 0.203*** | 0.026 |

| Variables | 2006 | | 2011 | | 2016 | |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| Household income | | | | | | |
| 50k to 100k | 0.112*** | 0.020 | 0.189*** | 0.021 | 0.076*** | 0.020 |
| above 100k | 0.254*** | 0.025 | 0.399*** | 0.025 | 0.178*** | 0.023 |
| Main activity | | | | | | |
| education | 0.113*** | 0.040 | 0.102** | 0.046 | -0.013 | 0.044 |
| unemployed | -0.307*** | 0.066 | -0.449*** | 0.059 | -0.498*** | 0.061 |
| retired | 0.082** | 0.033 | 0.169*** | 0.030 | 0.063** | 0.027 |
| child or housework | 0.060* | 0.031 | 0.051 | 0.035 | 0.121*** | 0.041 |
| mpleave | 0.138 | 0.149 | 0.095 | 0.163 | 0.167* | 0.098 |
| illness | -0.577*** | 0.053 | -0.277*** | 0.051 | -0.525*** | 0.047 |
| unpaid | -0.035 | 0.075 | 0.066 | 0.092 | 0.143** | 0.070 |
| Number of observations | 17,735 | | 17,399 | | 18,868 | |
| Cuts | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| Cut 3 | -1.013*** | 0.053 | -1.016*** | 0.051 | -1.214*** | 0.050 |
| (95% Conf. Interval) | -1.116 | -0.909 | -1.117 | -0.915 | -1.312 | -1.115 |
| Cut 4 | -0.761*** | 0.051 | -0.808*** | 0.050 | -0.974*** | 0.049 |
| (95% Conf. Interval) | -0.862 | -0.661 | -0.906 | -0.709 | -1.070 | -0.878 |
| Cut 5 | -0.231*** | 0.050 | -0.241*** | 0.048 | -0.485*** | 0.048 |
| (95% Conf. Interval) | -0.329 | -0.133 | -0.336 | -0.146 | -0.579 | -0.391 |
| Cut 6 | 0.117** | 0.050 | 0.084* | 0.048 | -0.142*** | 0.048 |
| (95% Conf. Interval) | 0.019 | 0.215 | -0.010 | 0.178 | -0.236 | -0.048 |
| Cut 7 | 0.743*** | 0.050 | 0.699*** | 0.048 | 0.498*** | 0.048 |
| (95% Conf. Interval) | 0.645 | 0.841 | 0.604 | 0.794 | 0.404 | 0.592 |
| Cut 8 | 1.622*** | 0.051 | 1.606*** | 0.049 | 1.397*** | 0.048 |
| (95% Conf. Interval) | 1.523 | 1.722 | 1.510 | 1.702 | 1.302 | 1.492 |
| Cut 9 | 2.279*** | 0.051 | 2.160*** | 0.049 | 1.964*** | 0.049 |
| (95% Conf. Interval) | 2.178 | 2.379 | 2.063 | 2.257 | 1.868 | 2.060 |
| Chi-square | 3014.75 | | 2890.49 | | 2757.36 | |
| Prob > chi2 | 0.000 | | 0.000 | | 0.000 | |
| Pseudo R-squared | 0.049 | | 0.049 | | 0.042 | |

NOTES: *** p<0.01, ** p<0.05, * p<0.1

As addressed in Section 4, the ordered probit model describes a nonlinear relationship between the dependent variable and independent variables. The numerical value of the dependent variables indicates only a ranking, rather than a quantitative measure. Thus, the estimated coefficients of the model which have been included in Table 16 are not enough to analyze the marginal effects. Tables 17 to 19 specifically measure the marginal effects for each variable for different levels of happiness for each year. Looking at the tables, there appears to be a virtual dividing line between Outcome 8 and Outcome 9, where the signs of all the estimated marginal effects change. This implies that for almost all variables, the magnitudes of the marginal effects change gradually in one direction, and then change sign right at Outcome 9. The only exception we can see is good health, for which the sign of the marginal effect changes between Outcome 7 and Outcome 8. In addition, the last rows in Tables 17 to 19 report the average predicted probabilities of each outcome for each yearly sample. It shows that the sum of the average predicted probabilities of the top two levels of happiness (Outcomes 9 and 10) are 37.9% in 2006, 40.9% in 2011 and 34.6% in 2016 respectively.

5.1. Individual characteristics

Gender can be one of the determinants affecting the subjective rating of well-being. As Table 16 shows, the estimated coefficient of the variable *female* is statistically significant at the 1% level across all three years' datasets; the positive estimated coefficients demonstrate that the level of females' happiness is significantly higher than that of males, holding all else constant. This result is consistent with the conclusion of Jung (2014) and Chui and Wong (2016). A positive marginal effect on Outcome 9 and Outcome 10 has also been found for female gender in Tables 17 to 19. It implies that female respondents always have a higher probability of being most satisfied with life than male respondents by 1.39 percentage points in 2006, 3.20 percentage points in 2011 and 1.95 percentage points in 2016 respectively.

In addition, good health is critically affecting people's happiness. The estimated coefficients of *good health* are also positive and significant as shown in Table 16, and they are aligned with my expectation that people with better health should be happier. This is because they do not have physical pain, and they do not need to consider medical expenses at all. Among all explanatory variables, the variable *good health* has the biggest marginal effect on happiness level 10 (Outcome 10), which is 0.154 in 2006, 0.154 in 2011 and 0.136 in 2016 respectively. This

implies that respondents with good health are more likely to be very satisfied with their life than those without good health. The probability difference is 15.4 percentage points in 2006, 15.4 percentage points in 2011 and 13.6 percentage points in 2016 respectively. The above findings are consistent with many previous findings. Cunado and Gracia (2012) also address the existence of a significantly positive relationship between health and happiness.

Additionally, a significantly positive relationship with happiness is found for marital status and religious affiliation. Individuals who are married or maintaining a common-law relationship appear to be happier on average than those who are single. In addition, the marginal effect of marital status on the highest level of happiness is also significant. The magnitude is 0.0847 in 2006, 0.105 in 2011 and 0.0663 in 2016 respectively. These results suggest that in comparison to those who do not have a partner, respondents with a partner are more likely to be happier, and the probability of achieving the highest level of happiness are increases by 8.47 percentage points in 2006, 10.5 percentage points in 2011 and 6.63 percentage points in 2016. Respondents with a religious affiliation are also believed to be relatively happier. Individuals with a religious affiliation also have a significantly higher probability of a high level of happiness than people without a religious affiliation (Tables 17 to 19). Furthermore, the marginal effect of religious affiliation is steadily on the rise from 2006 to 2016. Similar conclusions have also been drawn by Jung (2014) that people who are married are happier, and Protestants are happier after the subdivision of respondents' religious affiliation.

With regards to age, the estimated coefficients of all age groups are statistically significant at the 5% level in the year 2006, where the reference group consists of respondents with age 45 up to 54. The estimated coefficients of variables associated with ages between 15 and 24, between 55 and 64, as well as above 65 are even significant at the 1% level. Moreover, it is surprised that all the above estimates have a positive sign, while the estimated coefficient of the variable measuring the age group of 35 to 44 is negative based on data for 2006 and 2011. It could be inferred from the regression results in Table 16 that respondents with ages between 35 and 54 are the least happy across all groups in the years 2006 and 2011. The marginal effects of the various age groups are different depending on which group respondents belong to (shown in Table 17 to 19). The effect is significantly negative for age 35-45, while positive for residents with age below 35 and above 55. This implies that people whose age is between 35 to 45 are the least likely to be happy. This result

is consistent with the findings of Cunado and Gracia (2012) and Blanchflower and Oswald (2008), who argue that the relationship between age and happiness behaves like a “U” shape.

The number of children living at home also affects happiness significantly. Focusing on the regression results for 2006 and 2016 in Table 16, compared with those who have no children living in their household, respondents with one or two children living in the household are less happy as the associated coefficients are statistically significant and positive. However, households with four or more children living in the household are happier than people living with no children in 2006.

5.2. Socioeconomic characteristics

Living in a rural or urban area may play an important role in happiness. The results imply that compared with respondents living in rural areas, large urban centers’ residents are significantly less happy in all three years. Nevertheless, the sign of the estimate of the place of birth coefficient varies year over year. It is positive in 2006 and 2011, but negative in 2016. This may reflect that people who were born in Canada have become gradually less happy over time. According to Tables 17 to 19, the marginal effect of the variable *large urban* on the highest level of happiness is always negative, equaling -0.0362 in 2006, -0.0254 in 2011, and -0.0365 in 2016 respectively. This implies that respondents who are living in large urban centers area have a lower probability of rating their happiness of the highest level than those who are living in rural areas by 3.62 percentage points in 2006, 2.54 percentage points in 2011 and 3.65 percentage points in 2016.

Some additional insights can be obtained by analyzing the province in which respondents are living. Respondents from Newfoundland and Labrador and British Columbia are significantly happier than those living in Ontario across all yearly datasets. Moreover, the number of provincial dummy variables with a significantly positive estimated coefficient in Table 16 increases over time; in other words, those living outside of Ontario are increasingly likely to be happier than Ontario residents. Tables 17 to 19 show that the absolute value of the marginal effect of living in British Columbia is the largest in 2006, equal to 0.0206, while the effect of living in New Brunswick is the largest across all provinces in both the 2011 and 2016 data, at 0.0541 and 0.0439 respectively. Compared with residents who are living in Ontario, people from the above provinces are more likely to enjoy the highest level of happiness. On the contrary, the only significantly negative

marginal effect suggests that only the residents of Alberta in 2006 are less likely to be on the highest level of happiness in comparison to the residents of Ontario.

Education is also an important determinant of happiness. The estimates for educational attainments vary dramatically among these three years. Firstly, in 2016, all categories have estimated coefficients that are statistically significant at 1% level. Compared with only high school or equivalent, respondents whose educational attainments are above high school are significantly unhappier, while those whose educational attainments are below high school are significantly happier. The marginal effects of all categories for educational attainments in 2016 are statistically significant. The variables *above bachelor*, *bachelor* and *diploma* have a negative effect, of -0.0238, -0.0321 and -0.0111 respectively, while the marginal effect of the variable *below high school* is positive, and equal to 0.0528. Comparing the magnitudes, it can be concluded that respondents holding a Bachelor's degree as the highest level of educational attainment are the most likely to be less happy than those with a high school diploma only, by 3.21 percentage points. This counterintuitive conclusion is consistent with the finding of Meer and Wielers (2013), who insist that the effect of education on workers' happiness is negative. Secondly, Canadian residents who have received an "above bachelor" degree can be significantly happier than those with high school degree; however, Canadian residents with only a Bachelor's degree might be less happy than those with only a high school diploma.

Not surprisingly, with respect to main activity in the past 12 months, the results imply that people who were unemployed or had a long-term illness are less happy than those who had a paid job, based on empirical results across all the three years. Retired people are even happier than those who had a paid job. From Tables 17 to 19, the marginal effects of being unemployed during the last 12 months, and the effects of having a long-term illness are significantly negative for all three years. Having a long-term illness has the biggest effect of all categories. Nevertheless, the marginal effect of being retired is significantly positive, which increases the chance of achieving the highest rating of happiness by 2.06 percentage points in 2006, 4.88 percentage points in 2011 and 1.57 percentage points in 2016 respectively, compared with respondents who have a paid job.

Lastly, income is expected to have an impact on people's well-being. As Bonikowska, Helliwell, Hou and Schellenberg (2014) have revealed, there may exist a relationship between household income and happiness. The results in Table 16 indicate that compared with those whose

annual household income is below \$50,000, the level of happiness of individuals with an annual household income of \$50,000 to \$100,000 or above \$100,000 is higher.

Table 17. Marginal Effects for Ordered Probit Model in 2006

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-----------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|----------------------|
| Gender | | | | | | | | |
| female | -0.00244*** (-3.40) | -0.00128*** (-3.37) | -0.00416*** (-3.43) | -0.00369*** (-3.44) | -0.00667*** (-3.45) | -0.00183*** (-3.42) | 0.00614*** (3.44) | 0.0139*** (3.46) |
| Age | | | | | | | | |
| age1524 | -0.00721*** (-5.62) | -0.00395*** (-5.27) | -0.0132*** (-5.34) | -0.0122*** (-5.16) | -0.0233*** (-4.93) | -0.00999*** (-3.66) | 0.0190*** (5.61) | 0.0508*** (4.71) |
| age2534 | -0.00241** (-2.28) | -0.00128** (-2.25) | -0.00420** (-2.25) | -0.00376** (-2.23) | -0.00690** (-2.20) | -0.00219* (-1.96) | 0.00616** (2.26) | 0.0146** (2.18) |
| age3544 | 0.00266** (2.37) | 0.00139** (2.38) | 0.00450** (2.41) | 0.00396** (2.43) | 0.00709** (2.47) | 0.00174*** (2.80) | -0.00667** (-2.41) | -0.0147** (-2.49) |
| age5564 | -0.00690*** (-6.81) | -0.00371*** (-6.43) | -0.0123*** (-6.72) | -0.0112*** (-6.56) | -0.0213*** (-6.35) | -0.00850*** (-4.84) | 0.0179*** (6.96) | 0.0461*** (6.15) |
| ageabove65 | -0.0123*** (-10.33) | -0.00680*** (-9.17) | -0.0231*** (-10.24) | -0.0216*** (-9.85) | -0.0429*** (-9.34) | -0.0223*** (-6.40) | 0.0324*** (11.70) | 0.0965*** (8.60) |
| Birthplace | | | | | | | | |
| Canada | -0.00615*** (-5.33) | -0.00317*** (-5.29) | -0.0101*** (-5.60) | -0.00882*** (-5.72) | -0.0154*** (-5.98) | -0.00288*** (-7.68) | 0.0151*** (5.63) | 0.0315*** (6.13) |
| Marital status | | | | | | | | |
| partner | -0.0155*** (-14.58) | -0.00833*** (-12.27) | -0.0271*** (-16.34) | -0.0239*** (-16.58) | -0.0421*** (-18.41) | -0.00844*** (-9.93) | 0.0407*** (17.67) | 0.0847*** (19.53) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|
| Number of children | | | | | | | | |
| one child | 0.00317*** (2.83) | 0.00165*** (2.84) | 0.00531*** (2.90) | 0.00466*** (2.93) | 0.00827*** (3.00) | 0.00190*** (3.69) | -0.00786*** (-2.90) | -0.0171*** (-3.04) |
| two children | 0.00288** (2.37) | 0.00150** (2.39) | 0.00483** (2.43) | 0.00423** (2.45) | 0.00753** (2.51) | 0.00177*** (3.03) | -0.00714** (-2.43) | -0.0156** (-2.53) |
| three children | 0.00407** (2.03) | 0.00210** (2.06) | 0.00672** (2.11) | 0.00585** (2.15) | 0.0102** (2.23) | 0.00203*** (3.68) | -0.00996** (-2.11) | -0.0211** (-2.27) |
| more children | -0.000590 (-0.20) | -0.000311 (-0.20) | -0.00102 (-0.20) | -0.000905 (-0.20) | -0.00165 (-0.20) | -0.000484 (-0.19) | 0.00150 (0.20) | 0.00346 (0.19) |
| Health status | | | | | | | | |
| good health | -0.0606*** (-17.94) | -0.0298*** (-14.40) | -0.0856*** (-23.66) | -0.0632*** (-25.68) | -0.0801*** (-37.16) | 0.0487*** (13.47) | 0.116*** (33.29) | 0.154*** (46.80) |
| Religious status | | | | | | | | |
| religion | -0.00360*** (-3.70) | -0.00187*** (-3.69) | -0.00605*** (-3.80) | -0.00531*** (-3.84) | -0.00944*** (-3.93) | -0.00217*** (-4.67) | 0.00897*** (3.80) | 0.0195*** (3.99) |
| Province | | | | | | | | |
| NL | -0.00322** (-2.00) | -0.00172* (-1.96) | -0.00569* (-1.94) | -0.00514* (-1.91) | -0.00958* (-1.86) | -0.00336 (-1.55) | 0.00834* (1.96) | 0.0204* (1.82) |
| PE | 0.000789 (0.34) | 0.000413 (0.35) | 0.00134 (0.35) | 0.00119 (0.35) | 0.00213 (0.35) | 0.000560 (0.38) | -0.00198 (-0.35) | -0.00444 (-0.35) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|
| NS | 0.00219 (1.15) | 0.00114 (1.16) | 0.00368 (1.17) | 0.00323 (1.18) | 0.00576 (1.21) | 0.00136 (1.48) | -0.00545 (-1.17) | -0.0119 (-1.22) |
| NB | -0.00201 (-1.19) | -0.00107 (-1.17) | -0.00352 (-1.17) | -0.00315 (-1.15) | -0.00581 (-1.13) | -0.00188 (-1.00) | 0.00517 (1.17) | 0.0123 (1.12) |
| QC | -0.00285*** (-3.09) | -0.00151*** (-3.03) | -0.00496*** (-3.04) | -0.00445*** (-3.01) | -0.00820*** (-2.97) | -0.00264*** (-2.61) | 0.00729*** (3.07) | 0.0173*** (2.94) |
| MB | 0.00211 (1.08) | 0.00110 (1.09) | 0.00355 (1.10) | 0.00312 (1.11) | 0.00556 (1.13) | 0.00131 (1.38) | -0.00526 (-1.10) | -0.0115 (-1.14) |
| SK | 0.00402* (1.84) | 0.00207* (1.87) | 0.00664* (1.91) | 0.00577* (1.94) | 0.0101** (2.01) | 0.00201*** (3.32) | -0.00983* (-1.91) | -0.0208** (-2.05) |
| AB | 0.00484*** (2.58) | 0.00249*** (2.62) | 0.00796*** (2.69) | 0.00691*** (2.75) | 0.0121*** (2.86) | 0.00231*** (4.87) | -0.0118*** (-2.70) | -0.0248*** (-2.91) |
| BC | -0.00331*** (-3.13) | -0.00176*** (-3.06) | -0.00581*** (-3.06) | -0.00523*** (-3.02) | -0.00971*** (-2.96) | -0.00333** (-2.49) | 0.00850*** (3.10) | 0.0206*** (2.91) |
| Rural/urban | | | | | | | | |
| large urban | 0.00625*** (5.35) | 0.00330*** (5.21) | 0.0107*** (5.44) | 0.00955*** (5.45) | 0.0173*** (5.49) | 0.00489*** (5.14) | -0.0159*** (-5.50) | -0.0362*** (-5.49) |
| Educational attainment | | | | | | | | |
| above bachelor | 0.00136 (0.89) | 0.000713 (0.89) | 0.00231 (0.90) | 0.00203 (0.90) | 0.00365 (0.91) | 0.000923 (1.02) | -0.00341 (-0.90) | -0.00758 (-0.92) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------|-------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|-----------------------|
| bachelor | 0.00327*** (2.86) | 0.00170*** (2.87) | 0.00548*** (2.94) | 0.00480*** (2.97) | 0.00854*** (3.04) | 0.00199*** (3.64) | -0.00810*** (-2.94) | -0.0177*** (-3.07) |
| diploma | 0.00166* (1.82) | 0.000869* (1.82) | 0.00282* (1.83) | 0.00250* (1.84) | 0.00449* (1.85) | 0.00119* (1.95) | -0.00417* (-1.83) | -0.00936* (-1.86) |
| below high school | -0.00418*** (-4.35) | -0.00223*** (-4.23) | -0.00735*** (-4.29) | -0.00664*** (-4.22) | -0.0124*** (-4.13) | -0.00434*** (-3.39) | 0.0108*** (4.34) | 0.0263*** (4.05) |
| Household income | | | | | | | | |
| 50k to 100k | -0.00462*** (-5.73) | -0.00246*** (-5.49) | -0.00806*** (-5.70) | -0.00720*** (-5.66) | -0.0132*** (-5.67) | -0.00401*** (-5.03) | 0.0118*** (5.80) | 0.0277*** (5.65) |
| above 100k | -0.00927*** (-10.51) | -0.00513*** (-9.25) | -0.0173*** (-10.33) | -0.0159*** (-10.00) | -0.0306*** (-9.77) | -0.0129*** (-7.15) | 0.0251*** (10.99) | 0.0662*** (9.47) |
| Main activity | | | | | | | | |
| education | -0.00441*** (-3.07) | -0.00238*** (-2.97) | -0.00788*** (-2.96) | -0.00715*** (-2.89) | -0.0134*** (-2.80) | -0.00502** (-2.24) | 0.0115*** (3.02) | 0.0288*** (2.73) |
| unemployed | 0.0169*** (3.66) | 0.00825*** (3.85) | 0.0253*** (4.17) | 0.0208*** (4.50) | 0.0330*** (5.27) | -0.00152 (-0.52) | -0.0371*** (-4.29) | -0.0655*** (-5.43) |
| retired | -0.00332*** (-2.63) | -0.00177** (-2.58) | -0.00584** (-2.57) | -0.00526** (-2.54) | -0.00974** (-2.49) | -0.00326** (-2.13) | 0.00861*** (2.58) | 0.0206** (2.46) |
| child or housework | -0.00245** (-2.02) | -0.00130** (-1.99) | -0.00428** (-1.99) | -0.00384** (-1.96) | -0.00710* (-1.93) | -0.00234* (-1.67) | 0.00628** (2.00) | 0.0150* (1.90) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|----------------------------------------|---------------------|---------------------|---------------------|----------------------|----------------------|-----------------------|------------------------|-----------------------|
| mpleave | -0.00520 (-1.05) | -0.00282 (-1.02) | -0.00942 (-0.99) | -0.00863 (-0.96) | -0.0165 (-0.91) | -0.00681 (-0.70) | 0.0137 (1.02) | 0.0357 (0.88) |
| illness | 0.0392*** (7.26) | 0.0182*** (7.54) | 0.0524*** (9.09) | 0.0396*** (10.63) | 0.0541*** (16.17) | -0.0222*** (-3.90) | -0.0735*** (-10.27) | -0.108*** (-15.22) |
| unpaid | 0.00152 (0.45) | 0.000792 (0.45) | 0.00256 (0.45) | 0.00225 (0.46) | 0.00403 (0.47) | 0.000990 (0.54) | -0.00379 (-0.45) | -0.00836 (-0.47) |
| Number of observations | 17735 | 17735 | 17735 | 17735 | 17735 | 17735 | 17735 | 17735 |
| Average predicted probabilities | 0.021*** (0.001) | 0.013*** (0.001) | 0.052*** (0.002) | 0.059*** (0.002) | 0.165*** (0.003) | 0.312*** (0.003) | 0.200*** (0.003) | 0.179*** (0.003) |

NOTES: *** p<0.01, ** p<0.05, * p<0.1; individuals are happier as the index of outcome increases.

Table 18. Marginal Effects for Ordered Probit Model in 2011

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-----------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|----------------------|---------------------|
| Gender | | | | | | | | |
| female | -0.00425*** (-6.42) | -0.00192*** (-6.04) | -0.00828*** (-6.66) | -0.00668*** (-6.68) | -0.0135*** (-6.81) | -0.00621*** (-6.73) | 0.00880*** (6.72) | 0.0320*** (6.85) |
| Age | | | | | | | | |
| age1524 | -0.00879*** (-7.80) | -0.00421*** (-6.85) | -0.0191*** (-7.41) | -0.0163*** (-7.04) | -0.0357*** (-6.65) | -0.0252*** (-5.02) | 0.0178*** (9.44) | 0.0915*** (6.17) |
| age2534 | -0.00205** (-2.08) | -0.000939** (-2.04) | -0.00411** (-2.04) | -0.00335** (-2.02) | -0.00689** (-2.00) | -0.00352* (-1.85) | 0.00429** (2.08) | 0.0166** (1.98) |
| age3544 | 0.000740 (0.72) | 0.000335 (0.73) | 0.00145 (0.73) | 0.00117 (0.73) | 0.00235 (0.73) | 0.00108 (0.76) | -0.00154 (-0.73) | -0.00558 (-0.74) |
| age5564 | -0.00496*** (-5.60) | -0.00228*** (-5.29) | -0.0100*** (-5.60) | -0.00823*** (-5.51) | -0.0172*** (-5.42) | -0.00950*** (-4.68) | 0.0103*** (5.89) | 0.0419*** (5.29) |
| 1.ageabove65 | -0.0128*** (-11.83) | -0.00612*** (-9.75) | -0.0276*** (-12.84) | -0.0234*** (-12.45) | -0.0510*** (-12.45) | -0.0352*** (-9.44) | 0.0260*** (16.22) | 0.130*** (11.58) |
| Birthplace | | | | | | | | |
| Canada | -0.00225** (-2.47) | -0.00101** (-2.47) | -0.00435** (-2.52) | -0.00348** (-2.54) | -0.00696*** (-2.59) | -0.00301*** (-2.83) | 0.00467** (2.50) | 0.0164*** (2.61) |
| Marital status | | | | | | | | |
| partner | -0.0142*** (-14.03) | -0.00668*** (-10.93) | -0.0292*** (-16.39) | -0.0236*** (-16.32) | -0.0467*** (-18.52) | -0.0175*** (-15.75) | 0.0328*** (17.19) | 0.105*** (20.17) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------------|---------------------|
| Number of children | | | | | | | | |
| one child | 0.00130 (1.34) | 0.000584 (1.34) | 0.00252 (1.36) | 0.00202 (1.36) | 0.00406 (1.38) | 0.00182 (1.45) | -0.00269 (-1.35) | -0.00961 (-1.39) |
| two children | 0.00124 (1.15) | 0.000558 (1.16) | 0.00241 (1.17) | 0.00193 (1.18) | 0.00388 (1.19) | 0.00174 (1.25) | -0.00257 (-1.16) | -0.00919 (-1.19) |
| three children | -0.00108 (-0.71) | -0.000491 (-0.70) | -0.00214 (-0.70) | -0.00174 (-0.69) | -0.00357 (-0.69) | -0.00177 (-0.65) | 0.00225 (0.70) | 0.00854 (0.68) |
| more children | -0.00305 (-1.27) | -0.00141 (-1.24) | -0.00623 (-1.22) | -0.00514 (-1.20) | -0.0107 (-1.16) | -0.00596 (-1.01) | 0.00641 (1.27) | 0.0261 (1.14) |
| Health status | | | | | | | | |
| good health | -0.0346*** (-15.00) | -0.0151*** (-11.50) | -0.0606*** (-19.29) | -0.0438*** (-20.23) | -0.0728*** (-28.04) | 0.00512** (2.24) | 0.0680*** (22.70) | 0.154*** (33.77) |
| Religious status | | | | | | | | |
| religion | -0.00441*** (-5.00) | -0.00197*** (-4.86) | -0.00845*** (-5.21) | -0.00673*** (-5.28) | -0.0133*** (-5.46) | -0.00538*** (-6.29) | 0.00915*** (5.16) | 0.0311*** (5.57) |
| Province | | | | | | | | |
| NL | -0.00254** (-1.97) | -0.00117* (-1.93) | -0.00515* (-1.92) | -0.00423* (-1.89) | -0.00876* (-1.85) | -0.00468* (-1.65) | 0.00534** (1.97) | 0.0212* (1.82) |
| PE | -0.00287* (-1.73) | -0.00132* (-1.69) | -0.00583* (-1.67) | -0.00480 (-1.64) | -0.0100 (-1.60) | -0.00547 (-1.41) | 0.00603* (1.73) | 0.0243 (1.57) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|-----------------------|
| NS | -0.00101 (-0.76) | -0.000461 (-0.76) | -0.00201 (-0.76) | -0.00163 (-0.75) | -0.00334 (-0.74) | -0.00165 (-0.71) | 0.00212 (0.76) | 0.00800 (0.74) |
| NB | -0.00576*** (-5.34) | -0.00271*** (-4.94) | -0.0121*** (-5.09) | -0.0102*** (-4.90) | -0.0218*** (-4.68) | -0.0136*** (-3.76) | 0.0121*** (5.61) | 0.0541*** (4.48) |
| QC | 0.000668 (0.73) | 0.000302 (0.73) | 0.00131 (0.73) | 0.00105 (0.73) | 0.00213 (0.74) | 0.000979 (0.75) | -0.00139 (-0.73) | -0.00505 (-0.74) |
| MB | -0.000943 (-0.71) | -0.000430 (-0.71) | -0.00187 (-0.70) | -0.00152 (-0.70) | -0.00311 (-0.69) | -0.00153 (-0.66) | 0.00197 (0.71) | 0.00744 (0.69) |
| SK | -0.00221* (-1.83) | -0.00102* (-1.79) | -0.00445* (-1.79) | -0.00365* (-1.76) | -0.00753* (-1.73) | -0.00395 (-1.57) | 0.00464* (1.82) | 0.0182* (1.71) |
| AB | -0.00196** (-2.11) | -0.000898** (-2.07) | -0.00393** (-2.07) | -0.00321** (-2.05) | -0.00659** (-2.03) | -0.00336* (-1.88) | 0.00411** (2.10) | 0.0158** (2.01) |
| BC | -0.00206** (-2.14) | -0.000943** (-2.10) | -0.00412** (-2.11) | -0.00337** (-2.09) | -0.00693** (-2.06) | -0.00356* (-1.90) | 0.00431** (2.14) | 0.0167** (2.03) |
| Rural/urban | | | | | | | | |
| large urban | 0.00313*** (4.57) | 0.00144*** (4.37) | 0.00628*** (4.54) | 0.00513*** (4.49) | 0.0106*** (4.46) | 0.00540*** (4.10) | -0.00659*** (-4.62) | -0.0254*** (-4.42) |
| Educational attainment | | | | | | | | |
| above bachelor | -0.00435*** (-4.12) | -0.00203*** (-3.90) | -0.00901*** (-3.95) | -0.00749*** (-3.84) | -0.0158*** (-3.71) | -0.00915*** (-3.13) | 0.00920*** (4.17) | 0.0386*** (3.61) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|----------------------|
| bachelor | -0.00173** (-2.01) | -0.000792** (-1.98) | -0.00346** (-1.98) | -0.00282** (-1.97) | -0.00577* (-1.95) | -0.00289* (-1.84) | 0.00364** (2.00) | 0.0138* (1.94) |
| diploma | -0.000324 (-0.42) | -0.000147 (-0.42) | -0.000639 (-0.42) | -0.000517 (-0.42) | -0.00105 (-0.42) | -0.000497 (-0.42) | 0.000677 (0.42) | 0.00250 (0.42) |
| below high school | -0.000903 (-1.00) | -0.000410 (-0.99) | -0.00178 (-0.99) | -0.00145 (-0.99) | -0.00295 (-0.98) | -0.00144 (-0.95) | 0.00188 (1.00) | 0.00705 (0.98) |
| Household income | | | | | | | | |
| 50k to 100k | -0.00658*** (-8.53) | -0.00305*** (-7.58) | -0.0133*** (-8.77) | -0.0109*** (-8.67) | -0.0223*** (-8.81) | -0.0115*** (-7.89) | 0.0137*** (9.26) | 0.0540*** (8.74) |
| above 100k | -0.0119*** (-13.83) | -0.00583*** (-10.72) | -0.0266*** (-15.31) | -0.0226*** (-14.72) | -0.0485*** (-15.28) | -0.0298*** (-12.15) | 0.0271*** (17.21) | 0.118*** (15.13) |
| Main activity | | | | | | | | |
| education | -0.00346** (-2.42) | -0.00160** (-2.34) | -0.00707** (-2.33) | -0.00583** (-2.28) | -0.0122** (-2.22) | -0.00676* (-1.93) | 0.00726** (2.43) | 0.0296** (2.17) |
| unemployed | 0.0244*** (5.33) | 0.00992*** (5.51) | 0.0392*** (6.42) | 0.0283*** (7.15) | 0.0480*** (8.98) | 0.000269 (0.08) | -0.0436*** (-6.59) | -0.106*** (-9.31) |
| retired | -0.00565*** (-5.88) | -0.00263*** (-5.46) | -0.0117*** (-5.78) | -0.00963*** (-5.67) | -0.0201*** (-5.56) | -0.0112*** (-4.82) | 0.0121*** (6.02) | 0.0488*** (5.46) |
| child or housework | -0.00181 (-1.52) | -0.000827 (-1.50) | -0.00362 (-1.49) | -0.00296 (-1.48) | -0.00608 (-1.46) | -0.00312 (-1.34) | 0.00379 (1.52) | 0.0146 (1.44) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|----------------------------------------|---------------------|----------------------|---------------------|---------------------|---------------------|----------------------|-----------------------|-----------------------|
| mpleave | -0.00320 (-0.64) | -0.00148 (-0.63) | -0.00654 (-0.61) | -0.00541 (-0.60) | -0.0113 (-0.58) | -0.00635 (-0.50) | 0.00672 (0.64) | 0.0276 (0.57) |
| illness | 0.0128*** (4.38) | 0.00552*** (4.42) | 0.0228*** (4.85) | 0.0172*** (5.15) | 0.0315*** (5.80) | 0.00609*** (6.94) | -0.0253*** (-4.81) | -0.0706*** (-6.11) |
| unpaid | -0.00227 (-0.76) | -0.00104 (-0.74) | -0.00459 (-0.74) | -0.00376 (-0.73) | -0.00780 (-0.71) | -0.00416 (-0.64) | 0.00476 (0.75) | 0.0189 (0.70) |
| Number of observations | 17399 | 17399 | 17399 | 17399 | 17399 | 17399 | 17399 | 17399 |
| Average predicted probabilities | 0.017*** (0.001) | 0.009*** (0.001) | 0.049*** (0.002) | 0.050*** (0.002) | 0.150*** (0.003) | 0.316*** (0.003) | 0.180*** (0.003) | 0.229*** (0.003) |

NOTES: *** p<0.01, ** p<0.05, * p<0.1; individuals are happier as the index of outcome increases.

Table 19. Marginal Effects for Ordered Probit Model in 2016

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-----------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------|-----------------------|-----------------------|
| Gender | | | | | | | | |
| female | -0.00397*** (-4.96) | -0.00199*** (-4.86) | -0.00594*** (-5.02) | -0.00539*** (-5.03) | -0.00956*** (-5.08) | -0.000799*** (-3.53) | 0.00809*** (5.05) | 0.0195*** (5.10) |
| Age | | | | | | | | |
| age1524 | -0.0111*** (-7.09) | -0.00588*** (-6.50) | -0.0183*** (-6.60) | -0.0176*** (-6.30) | -0.0343*** (-5.84) | -0.0113*** (-3.45) | 0.0242*** (7.12) | 0.0742*** (5.48) |
| age2534 | -0.00290** (-2.15) | -0.00147** (-2.12) | -0.00443** (-2.12) | -0.00407** (-2.10) | -0.00738** (-2.06) | -0.00104 (-1.51) | 0.00601** (2.13) | 0.0153** (2.04) |
| age3544 | -0.0000968 (-0.07) | -0.0000486 (-0.07) | -0.000145 (-0.07) | -0.000132 (-0.07) | -0.000236 (-0.07) | -0.0000222 (-0.07) | 0.000198 (0.07) | 0.000483 (0.07) |
| age5564 | -0.00570*** (-4.79) | -0.00290*** (-4.64) | -0.00880*** (-4.72) | -0.00814*** (-4.65) | -0.0149*** (-4.53) | -0.00253*** (-2.99) | 0.0119*** (4.78) | 0.0311*** (4.46) |
| ageabove65 | -0.0139*** (-10.02) | -0.00730*** (-9.10) | -0.0225*** (-10.02) | -0.0212*** (-9.82) | -0.0402*** (-9.56) | -0.00957*** (-5.58) | 0.0307*** (10.54) | 0.0840*** (9.24) |
| Birthplace | | | | | | | | |
| Canada | 0.00725*** (8.11) | 0.00373*** (7.53) | 0.0114*** (8.00) | 0.0106*** (7.87) | 0.0196*** (7.68) | 0.00382*** (4.63) | -0.0154*** (-8.21) | -0.0410*** (-7.54) |
| Marital status | | | | | | | | |
| partner | -0.0137*** (-12.64) | -0.00700*** (-11.14) | -0.0209*** (-13.42) | -0.0190*** (-13.59) | -0.0331*** (-14.49) | -0.00130** (-2.08) | 0.0288*** (14.08) | 0.0663*** (14.97) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|---------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|
| Number of children | | | | | | | | |
| one child | 0.00388*** (2.92) | 0.00192*** (2.94) | 0.00568*** (3.01) | 0.00509*** (3.05) | 0.00883*** (3.14) | 0.000287 (1.53) | -0.00773*** (-3.02) | -0.0180*** (-3.16) |
| two children | 0.00398** (2.53) | 0.00197** (2.55) | 0.00581*** (2.61) | 0.00521*** (2.65) | 0.00902*** (2.72) | 0.000253 (1.18) | -0.00792*** (-2.61) | -0.0183*** (-2.75) |
| three children | 0.000175 (0.07) | 0.0000880 (0.07) | 0.000263 (0.07) | 0.000239 (0.07) | 0.000424 (0.07) | 0.0000378 (0.08) | -0.000358 (-0.07) | -0.000869 (-0.07) |
| more children | -0.0000709 (-0.01) | -0.0000356 (-0.01) | -0.000107 (-0.01) | -0.0000970 (-0.01) | -0.000173 (-0.01) | -0.0000163 (-0.01) | 0.000145 (0.01) | 0.000354 (0.01) |
| Health status | | | | | | | | |
| good health | -0.0530*** (-17.94) | -0.0243*** (-14.66) | -0.0656*** (-22.37) | -0.0516*** (-24.53) | -0.0684*** (-34.99) | 0.0437*** (13.85) | 0.0836*** (28.84) | 0.136*** (39.84) |
| Religious status | | | | | | | | |
| religion | -0.00851*** (-7.22) | -0.00419*** (-7.01) | -0.0123*** (-7.59) | -0.0110*** (-7.77) | -0.0188*** (-8.21) | 0.000260 (0.57) | 0.0169*** (7.70) | 0.0377*** (8.42) |
| Province | | | | | | | | |
| NL | -0.00711*** (-5.43) | -0.00370*** (-5.12) | -0.0114*** (-5.16) | -0.0107*** (-4.99) | -0.0203*** (-4.74) | -0.00488*** (-2.93) | 0.0154*** (5.27) | 0.0427*** (4.60) |
| PE | -0.00522*** (-2.65) | -0.00270** (-2.56) | -0.00825** (-2.52) | -0.00771** (-2.45) | -0.0144** (-2.35) | -0.00299 (-1.52) | 0.0112** (2.55) | 0.0301** (2.30) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|-----------------------|-----------------------|
| NS | -0.00533*** (-3.82) | -0.00275*** (-3.68) | -0.00838*** (-3.67) | -0.00781*** (-3.58) | -0.0145*** (-3.44) | -0.00293** (-2.23) | 0.0113*** (3.71) | 0.0304*** (3.37) |
| NB | -0.00729*** (-5.58) | -0.00379*** (-5.26) | -0.0117*** (-5.30) | -0.0110*** (-5.12) | -0.0208*** (-4.86) | -0.00511*** (-3.00) | 0.0157*** (5.43) | 0.0439*** (4.71) |
| QC | -0.00180 (-1.57) | -0.000912 (-1.56) | -0.00274 (-1.55) | -0.00251 (-1.54) | -0.00451 (-1.53) | -0.000539 (-1.23) | 0.00373 (1.56) | 0.00928 (1.52) |
| MB | -0.00683*** (-5.17) | -0.00355*** (-4.89) | -0.0109*** (-4.91) | -0.0103*** (-4.76) | -0.0193*** (-4.53) | -0.00455*** (-2.82) | 0.0147*** (5.02) | 0.0407*** (4.40) |
| SK | -0.00566*** (-4.22) | -0.00293*** (-4.05) | -0.00894*** (-4.05) | -0.00835*** (-3.94) | -0.0156*** (-3.78) | -0.00323** (-2.43) | 0.0121*** (4.10) | 0.0326*** (3.70) |
| AB | -0.00203 (-1.48) | -0.00103 (-1.46) | -0.00309 (-1.46) | -0.00284 (-1.44) | -0.00512 (-1.42) | -0.000666 (-1.10) | 0.00420 (1.46) | 0.0106 (1.41) |
| BC | -0.00230* (-1.90) | -0.00117* (-1.88) | -0.00351* (-1.88) | -0.00322* (-1.86) | -0.00581* (-1.83) | -0.000763 (-1.40) | 0.00477* (1.88) | 0.0120* (1.82) |
| Rural/urban | | | | | | | | |
| large urban | 0.00652*** (7.22) | 0.00336*** (6.76) | 0.0102*** (7.05) | 0.00954*** (6.91) | 0.0176*** (6.74) | 0.00319*** (4.20) | -0.0140*** (-7.13) | -0.0365*** (-6.69) |
| Educational attainment | | | | | | | | |
| above bachelor | 0.00534*** (3.08) | 0.00262*** (3.13) | 0.00770*** (3.22) | 0.00686*** (3.29) | 0.0118*** (3.43) | 0.0000366 (0.10) | -0.0105*** (-3.24) | -0.0238*** (-3.46) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|-------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|
| bachelor | 0.00724*** (5.06) | 0.00354*** (5.07) | 0.0104*** (5.33) | 0.00927*** (5.46) | 0.0159*** (5.72) | -0.0000265 (-0.06) | -0.0142*** (-5.38) | -0.0321*** (-5.79) |
| diploma | 0.00227** (2.19) | 0.00114** (2.19) | 0.00340** (2.21) | 0.00308** (2.22) | 0.00544** (2.24) | 0.000419** (2.32) | -0.00463** (-2.21) | -0.0111** (-2.24) |
| below high school | -0.00871*** (-8.39) | -0.00455*** (-7.73) | -0.0140*** (-8.15) | -0.0132*** (-7.89) | -0.0251*** (-7.54) | -0.00622*** (-4.50) | 0.0190*** (8.35) | 0.0528*** (7.33) |
| Household income | | | | | | | | |
| 50k to 100k | -0.00364*** (-3.77) | -0.00184*** (-3.70) | -0.00553*** (-3.74) | -0.00506*** (-3.73) | -0.00909*** (-3.70) | -0.00108*** (-2.76) | 0.00751*** (3.77) | 0.0187*** (3.69) |
| above 100k | -0.00826*** (-7.73) | -0.00425*** (-7.24) | -0.0129*** (-7.68) | -0.0118*** (-7.62) | -0.0215*** (-7.59) | -0.00306*** (-4.62) | 0.0174*** (7.88) | 0.0443*** (7.54) |
| Main activity | | | | | | | | |
| education | 0.000652 (0.29) | 0.000327 (0.29) | 0.000975 (0.29) | 0.000884 (0.30) | 0.00156 (0.30) | 0.000126 (0.35) | -0.00133 (-0.29) | -0.00320 (-0.30) |
| unemployed | 0.0373*** (5.67) | 0.0162*** (6.16) | 0.0434*** (7.12) | 0.0344*** (8.22) | 0.0473*** (12.08) | -0.0257*** (-3.78) | -0.0564*** (-7.81) | -0.0965*** (-10.79) |
| retired | -0.00301** (-2.37) | -0.00153** (-2.33) | -0.00462** (-2.33) | -0.00424** (-2.31) | -0.00764** (-2.28) | -0.000927* (-1.79) | 0.00632** (2.32) | 0.0157** (2.28) |
| child or housework | -0.00536*** (-3.27) | -0.00277*** (-3.15) | -0.00848*** (-3.12) | -0.00793*** (-3.04) | -0.0148*** (-2.91) | -0.00308* (-1.88) | 0.0115*** (3.16) | 0.0309*** (2.85) |

| Variables | Outcome 3 | Outcome 4 | Outcome 5 | Outcome 6 | Outcome 7 | Outcome 8 | Outcome 9 | Outcome 10 |
|----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|------------------------|-----------------------|
| mpleave | -0.00707** (-2.00) | -0.00370* (-1.91) | -0.0114* (-1.86) | -0.0108* (-1.78) | -0.0206* (-1.67) | -0.00542 (-1.04) | 0.0154* (1.90) | 0.0437 (1.61) |
| illness | 0.0393*** (7.75) | 0.0174*** (8.05) | 0.0466*** (9.61) | 0.0367*** (11.09) | 0.0496*** (16.58) | -0.0289*** (-5.27) | -0.0599*** (-10.76) | -0.101*** (-15.08) |
| unpaid | -0.00619** (-2.33) | -0.00322** (-2.24) | -0.00989** (-2.19) | -0.00930** (-2.12) | -0.0176** (-2.01) | -0.00417 (-1.27) | 0.0134** (2.23) | 0.0370* (1.95) |
| Number of observations | 18868 | 18868 | 18868 | 18868 | 18868 | 18868 | 18868 | 18868 |
| Average predicted probabilities | 0.023*** (0.001) | 0.015*** (0.001) | 0.053*** (0.002) | 0.062*** (0.002) | 0.178*** (0.003) | 0.323*** (0.003) | 0.169*** (0.003) | 0.177*** (0.003) |

NOTES: *** p<0.01, ** p<0.05, * p<0.1; individuals are happier as the index of outcome increases.

6. Conclusions

This paper tries to answer the question “what makes residents of Canada happy?” The question is raised because a downward trend has been observed in Canada’s year-over-year rankings of national happiness, while not much research has been conducted using Canadian data. The data used in this paper are drawn from the General Social Surveys (GSS) 2006, 2010, and 2016. An ordered probit model is employed, consisting of happiness (subjective life satisfaction) as the dependent variable, and a set of explanatory variables including individual characteristics (gender, age, birthplace, marital status, number of children living together, health status and religious status) and socioeconomic characteristics (educational attainment, place of living, income, and main activity).⁴

The results show that gender can significantly affect happiness, and that females are happier with life as a whole than males. The relationship between age and life satisfaction is found to behave like a “U” shape. A person living with a partner is significantly happier than people not being in a partnership. Individuals not living with children are happier than ones living with two or more children. Not surprisingly, people with better health may feel more satisfied with life. In order to improve happiness in Canada, government at all levels should take measures to enhance health services and to promote healthy living habits.

Additionally, people with advanced educational achievements are not happier than others less highly educated. Furthermore, consistent with the findings for Europe of Meer and Wielers (2011), I find that the happiness level is higher for individuals with higher incomes than for those with low incomes. I also find that people who are unemployed are less happy than respondents who have a job, and residents of Ontario are less happy than residents living in other provinces. Ideally, Canadian governments and companies should create more jobs and increase employees’ income to boost their life satisfaction level.

There are a few limitations to this study. Firstly, the results are based on some subjective variables, such as well-being and health status. The concern is that respondents may not be truthful about the questions asked (Cheng and Smyth 2015); especially, they may be not aware of their real health condition. Secondly, because the results rely on cross-sectional data, the paper may still have an endogeneity problem with respect to determinants like marital status, self-rated health

⁴ Results of OLS method are also presented in the Appendix.

status, educational attainment and household income. Using panel data or employing proper instrumental variables for one or more of these explanatory variables may resolve the issue and should be considered in further studies. Thirdly, this research has detected year-to-year variability in happiness, but does not use a formal statistical test to investigate whether the differences between years are due to differences in the coefficients of variables, or simply a difference in the constant term from year to year. Further studies could include a likelihood ratio test to distinguish between these two cases. Lastly, survey questions vary across years, making it harder to conduct comparisons between different years. Researchers should also investigate further the determinants of happiness of Ontario residents, as Ontario has the biggest population and the highest GDP, but the lowest life satisfaction when other factors are held constant.

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Appendix

The Regression Results of OLS

| Variables | 2006 | | 2011 | | 2016 | |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| Gender | | | | | | |
| female | 0.082*** | 0.023 | 0.150*** | 0.023 | 0.113*** | 0.023 |
| Age | | | | | | |
| age1524 | 0.300*** | 0.054 | 0.471*** | 0.063 | 0.410*** | 0.067 |
| age2534 | 0.104*** | 0.037 | 0.100** | 0.040 | 0.106** | 0.043 |
| age3544 | -0.070** | 0.035 | -0.018 | 0.037 | 0.016 | 0.040 |
| age5564 | 0.231*** | 0.039 | 0.205*** | 0.037 | 0.176*** | 0.039 |
| ageabove65 | 0.477*** | 0.053 | 0.595*** | 0.048 | 0.457*** | 0.047 |
| Birthplace | | | | | | |
| Canada | 0.194*** | 0.032 | 0.092*** | 0.031 | -0.207*** | 0.029 |
| Marital status | | | | | | |
| partner | 0.503*** | 0.026 | 0.544*** | 0.027 | 0.409*** | 0.027 |
| Number of children | | | | | | |
| one child | -0.104*** | 0.033 | -0.046 | 0.034 | -0.094*** | 0.035 |
| two children | -0.099*** | 0.037 | -0.034 | 0.038 | -0.089** | 0.041 |
| three children | -0.127** | 0.057 | 0.040 | 0.060 | 0.006 | 0.069 |
| more children | 0.017 | 0.100 | 0.119 | 0.105 | -0.019 | 0.139 |
| Health status | | | | | | |
| good health | 1.343*** | 0.033 | 0.999*** | 0.033 | 1.114*** | 0.032 |
| Religious status | | | | | | |
| religion | 0.110*** | 0.029 | 0.162*** | 0.029 | 0.238*** | 0.029 |
| Province | | | | | | |
| NL | 0.117** | 0.059 | 0.080 | 0.054 | 0.216*** | 0.048 |
| PE | 0.012 | 0.073 | 0.126* | 0.071 | 0.171** | 0.070 |
| NS | -0.046 | 0.058 | 0.030 | 0.052 | 0.171*** | 0.049 |
| NB | 0.066 | 0.060 | 0.246*** | 0.053 | 0.235*** | 0.048 |
| QC | 0.132*** | 0.032 | 0.008 | 0.034 | 0.074** | 0.035 |
| MB | -0.057 | 0.059 | 0.034 | 0.052 | 0.220*** | 0.048 |
| SK | -0.100 | 0.062 | 0.086* | 0.050 | 0.180*** | 0.047 |
| AB | -0.127** | 0.052 | 0.079** | 0.037 | 0.055 | 0.043 |
| BC | 0.132*** | 0.038 | 0.080** | 0.039 | 0.081** | 0.038 |
| Rural/urban | | | | | | |
| large urban | -0.195*** | 0.037 | -0.123*** | 0.027 | -0.197*** | 0.030 |
| Educational attainment | | | | | | |
| above bachelor | -0.012 | 0.048 | 0.193*** | 0.048 | -0.116*** | 0.044 |
| bachelor | -0.074** | 0.034 | 0.095*** | 0.034 | -0.168*** | 0.035 |
| diploma | -0.043 | 0.029 | 0.025 | 0.029 | -0.054* | 0.029 |
| below high school | 0.113*** | 0.035 | 0.020 | 0.034 | 0.240*** | 0.037 |
| Household income | | | | | | |
| 50k to 100k | 0.187*** | 0.024 | 0.284*** | 0.029 | 0.124*** | 0.029 |
| above 100k | 0.375*** | 0.035 | 0.555*** | 0.034 | 0.267*** | 0.033 |
| Main activity | | | | | | |
| education | 0.146*** | 0.056 | 0.128** | 0.063 | 0.001 | 0.064 |
| unemployed | -0.509*** | 0.092 | -0.772*** | 0.082 | -0.866*** | 0.088 |
| retired | 0.090** | 0.045 | 0.208*** | 0.041 | 0.075* | 0.039 |

| Variables | 2006 | | 2011 | | 2016 | |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| child or housework | 0.045 | 0.043 | 0.022 | 0.048 | 0.134** | 0.058 |
| mpleave | 0.177 | 0.206 | 0.056 | 0.220 | 0.218 | 0.140 |
| illness | -1.023*** | 0.073 | -0.546*** | 0.070 | -0.935*** | 0.067 |
| unpaid | -0.153 | 0.103 | -0.022 | 0.125 | 0.149 | 0.098 |
| Constant | 6.053*** | 0.069 | 6.162*** | 0.065 | 6.390*** | 0.068 |
| Number of observations | 17,735 | | 17,399 | | 18,868 | |
| F-statistic | 103.87 | | 98.15 | | 88.64 | |
| Prob > f | 0.000 | | 0.000 | | 0.000 | |
| Mean VIF | 1.50 | | 1.43 | | 1.49 | |
| R-squared | 0.178 | | 0.173 | | 0.148 | |

NOTES: *** p<0.01, ** p<0.05, * p<0.1.