

The key to win the 2020 election for Liberal - satisfaction of supporters on work of COVID-19

Group 80: Lan Cheng, Liyuan Cao, Shabier Zulihumaer and Cheng chen

2020-10-07

Executive summary

This study focus on investigate the relationship between satisfaction of work of COVID-19 and favoring Liberal for young voters in the election of Canada. This study finds that for the young voters who are aged between 18 to 25, the male young voters who voted for Liberal appear to have a lower proportion of favoring Liberal in ON for 2020 election compared with other groups. And there is a big difference between the two groups of whether satisfied of the work for COVID-19 in proportions of favoring Liberal if the young voters voted for Liberal before. Thus, this study suggests the Liberal party to focus on the work in dealing with COVID-19 as it might be the key to win the 2020 election.

Introduction

People's Health is always one of most important topic in the elections, and it would be the same for the 2020 election in Canada. And in current days, the most important issue is the COVID-19 for all of the countries in the world including Canada. Pagan, C. (2016, August 23) pointed out that the key problem of People's Health would be an immunity challenge. And the Government Canada, P. (2020, September 13) pointed out the spread of COVID-19 in Canada tends to be more and more serious based on the information by the site 'Tracking coronavirus' global spread. And it is known that in 2015, young people came out to be the key group to elect Justin Trudeau and the Liberal Party. Under this background, it is assumed that whether the young voters is satisfied of work of Liberal party in dealing with COVID-19 would be the key in the 2020 election in Canada if the Liberal party want to win. So, this study is aimed to investigate the relationship between satisfaction of work of COVID-19 and favoring Liberal for young voters in the election of Canada. The PDF source of the study could be found in the link: https://github.com/tong304/voting/blob/main/tong_a2.pdf.

Survey methodology

The objective of the survey is to investigate the proportions of favoring Liberal in ON for 2020 election in two groups for young voters who are aged between 18 and 25 years old and once voted for Liberal before. One group is the group of the young voters who are satisfied about the work dealing with COVID-19 of the Liberal party, the other group is the group of the young voters who are not satisfied about the work dealing with COVID-19 of the Liberal party.

The target population is all of young Canadian students who are living in ON, the frame is a list of students that registered in the schools in ON, the sample is 1000 Canadian students.

The data needed to be collected in the survey is whether they will vote for Liberal or not in the 2020 election. The required accuracy of estimates is within 0.2 percent.

The sampling method selected in the survey is SRSWOR which is a method of selection of n samples out of the N population one by one, and in this sampling method, at any stage of the selection, any one of the

remaining units has equal chance being selected. The details of the selection in the survey is as below:

- 1). Identify the N students in the population frame with the numbers 1 to N .
- 2). Choose any random number using R code.
- 3). Choose the sampling student whose student ID corresponds to the random number drawn from the step 2).
- 4). Removing that student from the frame list.
- 5). Repeat the previous procedures until 1000 students are obtained.

In the sampling method SRSWOR, if we denote the population characteristic of favoring Liberal in ON for 2020 election as a binary outcome Y_i , and if favoring Liberal, $Y_i = 1$, otherwise, $Y_i = 0$. Then we have the total number with the response 1 which means favoring Liberal in ON for 2020 election in the population is:

$$T = \sum_{i=1}^N Y_i$$

Where N is the population size. The proportion with the response 1 in the population is:

$$P = \frac{T}{N}$$

Now, we denote the sample characteristic of favoring Liberal in ON for 2020 election as a binary outcome y_i , and if favoring Liberal, $y_i = 1$, otherwise, $y_i = 0$, and the sample size is $n = 1000$. The proportion of sample that with the response 1 favoring Liberal in ON for 2020 election is:

$$p = \frac{\sum_{i=1}^n y_i}{n}$$

The sample variance of the proportion using the sampling method SRSWOR is:

$$var(p) = \frac{p(1-p)}{n-1} \left(1 - \frac{n}{N}\right)$$

And as N is much larger than n for this survey, the sample variance of the proportion could be approximated by:

$$var(p) = \frac{p(1-p)}{n-1}$$

The important reason of choosing the sampling method SRSWOR is that it has the most important statistical property for estimators that the sample proportion p is an unbiased estimator of the population proportion P .

This survey is going to reach the desired respondents by Mail based on the information of the students registered in the schools in ON. The cost of this survey would be about $(10 + 2) * 1000 + 500 = 12500$ dollars. For each of the sample, 10 dollars would be spent on a gift card and 2 dollars would be spent on a paid envelop. And the left 500 dollars is the fix cost of the survey design. This survey provides a gift card for each sample along with the survey which is designed to deal with the non-response problem, because the survey is short, a 10 dollar gift card should be enough for samples to feel it is worth to complete the survey. This is important because there are always issues of non-response in survey, the biggest effect of the non-response issue on the survey that it would cause non-response bias which would make the estimates not reliable. However, sometimes the non-response issue is hard to avoid, samples might not to vote or prefer not to complete the survey even after they accepted the gift card.

At last, it is very important to protect the respondent privacy in the survey, one of the important reasons is that the plotical vote is a very sensitive topic. And this survey would sign privacy contract and make a copy along with the survey before mail to the samples.

Results

Table 1 and Figure 1 show the estimated proportions of favoring Liberal in ON for 2020 election grouped by gender and whether voted for Liberal before. From the table 1 and figure 1, it can be found that for female young voters who are not ever voted for Liberal shows an estimated proportion of favoring Liberal about 0.350 with a SD = 0.0443, it is close to the male young voters who are not ever voted for Liberal with estimated proportion of favoring Liberal about 0.376 with a SD = 0.0484. And for female young voters who voted for Liberal before shows an estimated proportion of favoring Liberal about 0.358 with a SD = 0.0665, it is higher than the male young voters who voted for Liberal with estimated proportion of favoring Liberal about 0.309 with a SD = 0.0629. The conclusion is that male young voters who voted for Liberal appear to show a lower proportion of favoring Liberal in ON for 2020 election compared with other groups.

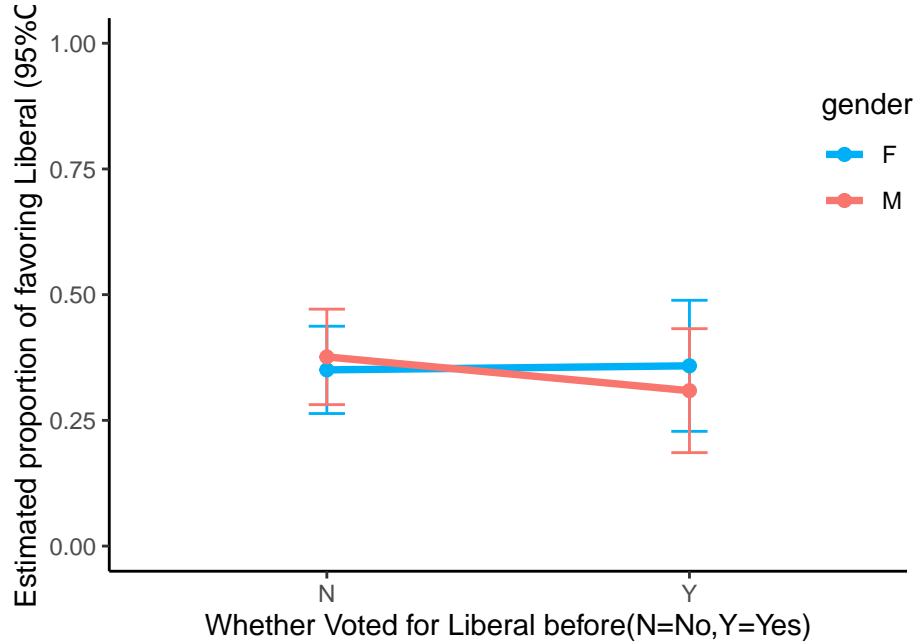


Figure 1: An investigation of estimated proportions of favoring Liberal (95%CI) in ON for 2020 election grouped by gender(F=female,M=male) and whether voted for Liberal before

Table 1: Estimated proportion of favoring Liberal (95%CI) grouped by gender and whether voted for Liberal before

| gender | voted | mean | SD |
|--------|-------|-----------|-----------|
| F | N | 0.3504274 | 0.0442980 |
| F | Y | 0.3584906 | 0.0665026 |
| M | N | 0.3762376 | 0.0484441 |
| M | Y | 0.3090909 | 0.0628864 |

Table 2 and Figure 2 show the estimated proportions of favoring Liberal in ON for 2020 election grouped by whether satisfied of the work for COVID-19 and whether voted for Liberal before. The original scale of satisfaction is a linear scale from 1 to 5, in this part, it is converted into a binary outcome group that the satisfaction group is the group which shows a score no less than 4 while the non-satisfaction group is the group which shows a score no higher than 3.

From the table 2 and figure 2, it can be found that for satisfied young voters who are not ever voted for

Liberal shows an estimated proportion of favoring Liberal about 0.356 with a SD = 0.0513, it is very close to the not satisfied young voters who are not ever voted for Liberal shows an estimated proportion of favoring Liberal about 0.366 with a SD = 0.0421. And for satisfied young voters who voted for Liberal before shows an estimated proportion of favoring Liberal about 0.364 with a SD = 0.0837, it is higher than the not satisfied young voters who voted for Liberal with estimated proportion of favoring Liberal about 0.320 with a SD = 0.0539. The conclusion is that there is no big difference between the two groups of whether satisfied of the work for COVID-19 in proportions of favoring Liberal if the young voters are not ever voted for Liberal, but there is a big difference between the two groups of whether satisfied of the work for COVID-19 in proportions of favoring Liberal if the young voters voted for Liberal before.

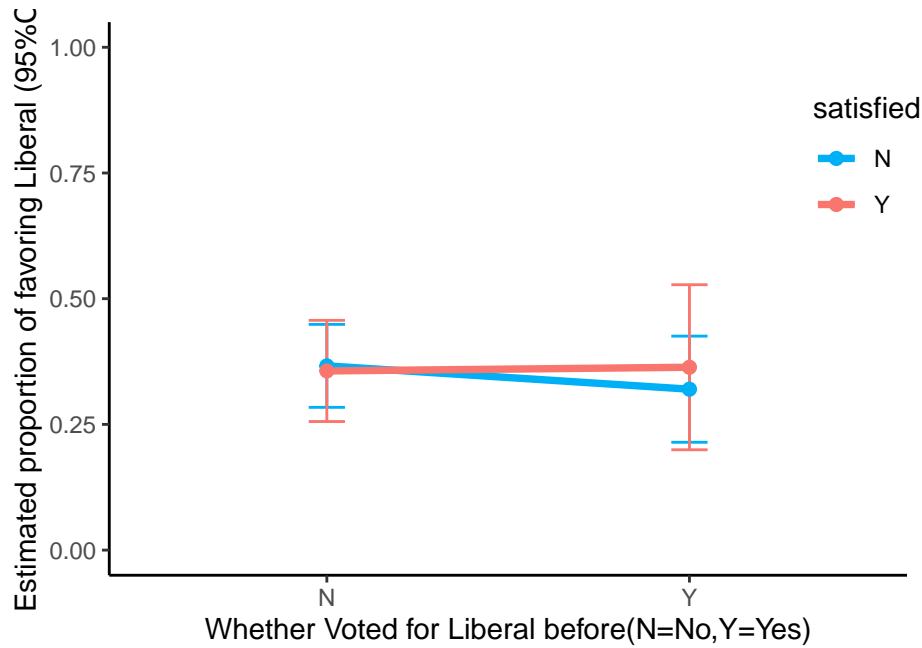


Figure 2: An investigation of estimated proportions of favoring Liberal (95%CI) in ON for 2020 election grouped by satisfaction of work for COVID-19(N= score ≤ 3 , Y = score ≥ 4) using a linear scale 1-5 and whether voted for Liberal before

Table 2: Estimated proportion of favoring Liberal (95%CI) grouped by satisfaction and whether voted for Liberal before

| satisfied | voted | mean | SD |
|-----------|-------|-----------|-----------|
| N | N | 0.3664122 | 0.0420972 |
| N | Y | 0.3200000 | 0.0538640 |
| Y | N | 0.3563218 | 0.0513447 |
| Y | Y | 0.3636364 | 0.0837393 |

Discussion

The founding of the above shows that for the young voters who are aged between 18 to 25, the male young voters who voted for Liberal appear to have a lower proportion of favoring Liberal in ON for 2020 election compared with other groups. And there is a big difference between the two groups of whether satisfied of the work for COVID-19 in proportions of favoring Liberal if the young voters voted for Liberal before. However, there are some potential weaknesses in this study. First, as this survey applied the sampling method

SRSWOR, there is a problem in lack of listing frame which means the SRSWOR requires a list of population to be available, but for this case, the ideal deal target population is not available, for examples, there are might be lots of cases are confirmed by the COVID-19 and they can not be investigated in the survey. Second, there is still problem of non-response bias as in the sampling method SRSWOR of this study, mail is used to implement the survey, there might be samples do not want to complete the survey. Third, the total sample size is 1000 in the survey, however, there might be samples collected in the survey that are not interested for the study, for example, if samples do not answer the question of which party to vote or whether they voted Liberal party before, these samples can not be used, thus, the actual sample size for the study is less than 1000 which might not be enough if we want the results to be reliable based on a relative large sample size. Last, the order of questions might be important in this survey, for example, the relative order of question of whether satisfied by work in dealing with COVID-19 and which party to vote might be important as for some samle units, they might think the question of whether satisfied by work in dealing with COVID-19 might remind them that the Liberal party did not work well and thus they might not vote for the Liberal party. So in the future study, these issues could be futher discussed to improve the results obtained.

References

1. Canada, P. (2020, September 13). Government of Canada. Retrieved September 30, 2020, from <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>
2. Hadley Wickham, Romain Franois, Lionel Henry and Kirill Muller (2019). dplyr: A Grammar of Data Manipulation. R package version 0.8.3. <https://CRAN.R-project.org/package=dplyr>
3. H. Wickham. ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York, 2016.
4. JJ Allaire and Yihui Xie and Jonathan McPherson and Javier Luraschi and Kevin Ushey and Aron Atkins and Hadley Wickham and Joe Cheng and Winston Chang and Richard Iannone (2020). rmarkdown: Dynamic Documents for R. R package version 2.1. URL <https://rmarkdown.rstudio.com>.
5. Pagan, C. (2016, August 23). The Immunity Challenge: How aging affects your immune system. Retrieved September 30, 2020, from <https://www.webmd.com/healthy-aging/guide/seniors-boost-immunity>
6. R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>
7. Tracking coronavirus' global spread. (n.d.). Retrieved September 30, 2020, from <https://www.cnn.com/interactive/2020/health/coronavirus-maps-and-cases/>
8. Yihui Xie (2014) knitr: A Comprehensive Tool for Reproducible Research in R. In Victoria Stodden, Friedrich Leisch and Roger D. Peng, editors, Implementing Reproducible Computational Research. Chapman and Hall/CRC. ISBN 978-1466561595

Appendix

The survey link is: https://docs.google.com/forms/d/1A9hBwoQjdfLYTZhowoLbP8l5n_cuIhU0owff3vu8FpY/edit

The Github repo link of source codes in a rmd format is: <https://github.com/tong304/voting>.

The screenshot of the survey is as below:

A survey of voting for the Liberal Party

This is a short survey focused on investigating the willness of voting for parties in Canada.

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Prefer not to say

What is your age?

Short-answer text

Are you satisfied about the government in dealing with COVID-19?

- | | | | | | | |
|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Not at all satisfied | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very satisfied |

Have you ever voted for the Liberal Party before?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Which party will you vote for the first choice?

- ☐ Liberal Party
- ☐ Conservative Party
- ☐ NDP
- ☐ Green Party
- ☐ People's Party
- ☐ Bloc Québécois
- ☐ Others

How do you likely to vote?

- | | | | | | | |
|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Certain not to vote | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Certain to vote |