Background

In this experiment, the main objective is to determine if there is a difference between the average total income and each of the highest populated provinces within Canada, using the data provided from Stats Canada. The data being used in this analysis are the 40 selected average income (CAD) in 40 different cities – there are 8 randomly selected average incomes per province in Canada during the year 2015. The 40-sample data are independently and randomly selected. Furthermore, the selection from the city’s average income of each province is independent of each other. The population of each province is assumed to be normally distributed and have a sample variance to meet the assumptions of the technique that will be used in this experiment (Levine et al., 2018, p.186). By selecting 8 random cities in 5 of the highest populated provinces and by collecting the average total income of each city, the correlation between the average total income and the provinces in Canada can be examined with the technique one-way ANOVA using SPSS (Statistical Package for the Social Sciences).

One-way ANOVA is the most appropriate technique to use to compare the average total income because it allows us to compare 3 or more populations with having one independent variable and one categorical variable (Levine et al., 2018, p.178). The independent variable would be the average income and the categorical variable would be the provinces. It would tell if the average total income would differ based on the provinces. Using the SPSS software, it would be easier to run the Tukey-Kramer procedure which determines which of the pairs of provinces are significantly different if there is a difference between the average total income (Levine et al., 2018, p.178). If there is not a significant difference in the average total income, then it would not be necessary to run the Tukey-Kramer (Levine et al., 2018, p.191).

Establish Research Objectives

As a group, we have chosen to research data on One-Way ANOVA. This term examines an analysis of variance to compare means of the groups. This data uses specific notations used in SPSS. We believe that utilizing the ANOVA technique would work out as it would provide us with significant findings to write about. We headed on over to the Statistics Canada website to get the information we need to perform-one-way ANOVA.

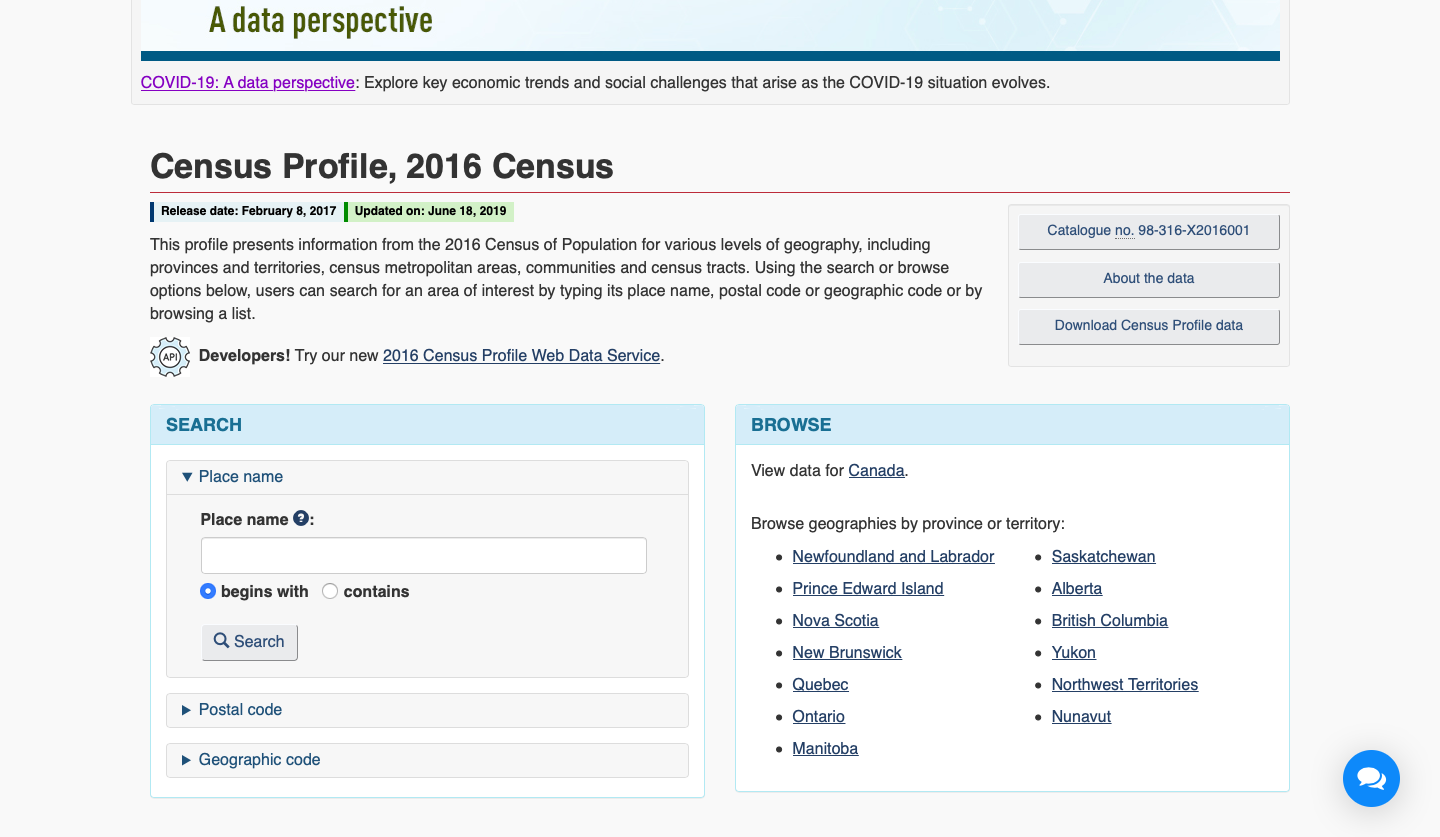
We came across a Census Profile of 2016 to analyze a value from a National Census. This profile presents information from the 2016 Census of Population for various levels of geography, including province and territories, census metropolitan areas, communities, and census tracts (Statistics Canada, 2020). By using the search or browse options below, users can search for an area of interest by simply typing the name of a place, postal code, or geographical code.

The basic steps to conduct an ANOVA is to perform a hypothesis testing for three or more population means. With this being said, we can have 4-5 groups from different provinces and 10 values within each group to form a data set. We decided to test the hypothesis from a 2015 data set about the average total of income in Canada. The provinces we chose are Ontario, Quebec, British Columbia, Alberta, and Manitoba. The SPSS program will help us to determine if there is evidence of a difference in the mean total income across the five provinces.

*Setting the Data*

The SPSS program helps us to gain insight into large-scale data such as the census to perform sophisticated statistical analysis. This way we have a better understanding of the data we chose to analyze and to drive accurate conclusions.

It is critical that we set up the data in the SPSS program correctly. If it’s not set properly, the data will be analyzed improperly. For a simple one-way ANOVA, we need to have one variable that is dependent and the other to have a group measure.

Microsoft Excel is the most common source for importing data into SPSS. This makes it easier for us to transfer all data into the SPSS smoothly. To import data to SPSS, we input the data into an Excel spreadsheet. This step was completed to have an overview of the mean income in each of the provinces we chose. This was to build a visualization, view patterns in income, and summarize variables.

*Statistics Canada Website*

Data Collection (temp)

- used StatsCan National Census for 2015, first available one

- selected the 5 highest populated provinces within the country

- searched only for cities, or ville in the case of Quebec, as the census also includes townships, municipalities, villages, which would not allow for a strong hypothesis test

- sampled 8 cities at random within each province, scrolled and stopped at random intervals, and picked one from that section

- used the Average Total Income Among Recipients per city value in $CAD because that would allow for the most interesting variance testing

**(add to appendix once completed)**

Average Total Income Among Recipients per province, in order of population, according to 2015 Canadian National Census;

Ontario:

|  |  |
| --- | --- |
| **City** | **Average Total Income Among Recipients** |
| Toronto | $ 52,268 |
| Mississauga | $ 45,267 |
| Brampton | $ 37,647 |
| Peterborough | $ 39,693 |
| Windsor | $ 38,669 |
| London | $ 43,663 |
| Guelph | $ 47,430 |
| Hamilton | $ 43,966 |

Quebec:

|  |  |
| --- | --- |
| **City** | **Average Total Income Among Recipients** |
| Alma | $ 39,737 |
| Boucherville | $ 66,313 |
| Farnham | $ 34,921 |
| Duparquet | $ 46,039 |
| Hampstead | $ 114,120 |
| Hudson | $ 63,544 |
| Kirkland | $ 60,660 |
| La Prairie | $ 52,206 |

British Columbia:

|  |  |
| --- | --- |
| **City** | **Average Total Income Among Recipients** |
| Burnaby | $ 40,192 |
| Abbotsford | $ 40,098 |
| Greenwood | $ 29,245 |
| Kelowna | $ 47,435 |
| Langford | $ 46,024 |
| Nanaimo | $ 40,502 |
| Richmond | $ 38,039 |
| Kamloops | $ 46,059 |

Alberta:

|  |  |
| --- | --- |
| **City** | **Average Total Income Among Recipients** |
| Brooks | $ 47,950 |
| Edmonton | $ 57,032 |
| Calgary | $ 67,741 |
| Camrose | $ 51,869 |
| Red Deer | $ 57,513 |
| Spruce Grove | $ 61,362 |
| Lacombe | $ 56,857 |
| Grande Prairie | $ 60,400 |

Manitoba:

|  |  |
| --- | --- |
| **City** | **Average Total Income Among Recipients** |
| Brandon | $ 45,006 |
| Morden | $ 39,514 |
| Thompson | $ 55,517 |
| Selkirk | $ 38,629 |
| Winnipeg | $ 44,916 |
| Winkler | $ 35,333 |
| Steinbach | $ 39,342 |
| Dauphin | $ 38,487 |

Data Analysis Using SPSS