

PS3

load libraries

```
library(ggplot2)
library(dplyr)

##
## Attaching package: 'dplyr'
##
## The following objects are masked from 'package:stats':
##
##   filter, lag
##
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
library(statsr)
library(tidyr)
```

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Github repository: <https://github.com/pinlu-chen/Problem-Set-3>

Abstract

Established in 1985, the Canadian General Social Survey (GSS) program was developed as a series of independent annual voluntary intersectoral surveys, each covering a single topic. The overall objectives of the program were and continue to be to collect data on social trends in order to monitor changes in the living conditions and well-being of Canadians, and to provide information on specific social policy issues.

Recent surveys of GSS programs focused on seven topics: life at work and at home; families; care and receiving care; giving, volunteering and participating; victimization; social identity and time use.

In this paper we analyze the most recent accessible GSS data and apply statistical models.

Introduction

The General social survey collects information from people aged 15 and older in ten provinces of Canada, with the exception of permanent residents in institutions. The victimization cycle, last collected in 2009 and 2014, was also conducted in the territories of Canada.

The sample size for GSS has changed over time. Prior to 1998, the target final sample size for each GSS cycle was approximately 10,000. This figure was increased in 1999 to a target of 25,000 people until 2015, when this figure was reduced to 22,000 people, and then further reduced to 20,000 people starting in 2016.

Data

First, we clean the downloaded GSS data by using the given R script

After cleaning the downloaded GSS data, we load the clean gss.csv into R dataframe

```
df <- read.csv("gss.csv")
```

Display some rows

```
head(df)
```

```

## caseid age age_first_child age_youngest_child_under_6 total_children
## 1 1 52.7 27 NA 1
## 2 2 51.1 33 NA 5
## 3 3 63.6 40 NA 5
## 4 4 80.0 56 NA 1
## 5 5 28.0 NA NA 0
## 6 6 63.0 37 NA 2
## age_start_relationship age_at_first_marriage age_at_first_birth
## 1 NA NA 25.9
## 2 NA NA NA
## 3 NA NA 23.2
## 4 NA NA 27.3
## 5 25.3 NA NA
## 6 NA NA 25.8
## distance_between_houses age_youngest_child_returned_work feelings_life sex
## 1 30 NA 8 Female
## 2 NA NA 10 Male
## 3 NA NA 8 Female
## 4 NA NA 10 Female
## 5 NA NA 8 Male
## 6 NA NA 9 Female
## place_birth_canada place_birth_father place_birth_mother
## 1 Born in Canada Born in Canada Born in Canada
## 2 Born in Canada Born in Canada Born in Canada
## 3 Born in Canada Born in Canada Born in Canada
## 4 Born in Canada Born outside Canada Born outside Canada
## 5 Born in Canada Born in Canada Born in Canada
## 6 Born in Canada Born in Canada Born in Canada
## place_birth_macro_region place_birth_province year_arrived_canada province
## 1 <NA> Quebec <NA> Quebec
## 2 <NA> Ontario <NA> Manitoba
## 3 <NA> Ontario <NA> Ontario
## 4 <NA> Alberta <NA> Alberta
## 5 <NA> Quebec <NA> Quebec
## 6 <NA> Quebec <NA> Quebec
## region pop_center
## 1 Quebec Larger urban population centres (CMA/CA)
## 2 Prairie region Larger urban population centres (CMA/CA)
## 3 Ontario Rural areas and small population centres (non CMA/CA)
## 4 Prairie region Larger urban population centres (CMA/CA)
## 5 Quebec Larger urban population centres (CMA/CA)
## 6 Quebec Larger urban population centres (CMA/CA)
## marital_status aboriginal vis_minority age_immigration
## 1 Single, never married No Not a visible minority <NA>
## 2 Married No Not a visible minority <NA>
## 3 Married No Not a visible minority <NA>
## 4 Married No Not a visible minority <NA>
## 5 Living common-law No Not a visible minority <NA>
## 6 Married No Not a visible minority <NA>
## landed_immigrant citizenship_status
## 1 <NA> By birth
## 2 <NA> By birth
## 3 <NA> By birth
## 4 <NA> By birth

```

```

## 5          <NA>          By birth
## 6          <NA>          By birth
##                                     education
## 1 High school diploma or a high school equivalency certificate
## 2                                     Trade certificate or diploma
## 3          Bachelor's degree (e.g. B.A., B.Sc., LL.B.)
## 4 High school diploma or a high school equivalency certificate
## 5 College, CEGEP or other non-university certificate or di...
## 6 High school diploma or a high school equivalency certificate
##                                     own_rent
## 1 Owned by you or a member of this household, even if it i...
## 2 Owned by you or a member of this household, even if it i...
## 3 Owned by you or a member of this household, even if it i...
## 4 Owned by you or a member of this household, even if it i...
## 5          Rented, even if no cash rent is paid
## 6 Owned by you or a member of this household, even if it i...
## living_arrangement          hh_type hh_size
## 1          Alone Low-rise apartment (less than 5 stories)          1
## 2          Spouse only          Single detached house          2
## 3          Spouse only          Single detached house          2
## 4          Spouse only          Other          2
## 5          Spouse only Low-rise apartment (less than 5 stories)          2
## 6          Spouse only          Single detached house          2
## partner_birth_country partner_birth_province partner_vis_minority
## 1          Canada          Quebec Not a visible minority
## 2          Canada          Manitoba Not a visible minority
## 3          Canada          Ontario Not a visible minority
## 4          Canada          Alberta Not a visible minority
## 5          Canada          Quebec Not a visible minority
## 6          Canada          Quebec Not a visible minority
## partner_sex          partner_education
## 1          <NA>          Trade certificate or diploma
## 2          <NA>          Bachelor's degree (e.g. B.A., B.Sc., LL.B.)
## 3          <NA> High school diploma or a high school equivalency certi...
## 4          <NA> Less than high school diploma or its equivalent
## 5          <NA> College, CEGEP or other non-university certificate or d...
## 6          <NA> College, CEGEP or other non-university certificate or d...
## average_hours_worked worked_last_week          partner_main_activity
## 1 30.0 to 40.0 hours          Yes Working at a paid job or business
## 2 50.1 hours and more          Yes          Going to school
## 3          <NA>          No          Retired
## 4          <NA>          No          Retired
## 5 30.0 to 40.0 hours          No Working at a paid job or business
## 6          <NA>          No          Retired
## selfRatedHealth selfRatedMentalHealth religionHasAffiliation
## 1          Excellent          Excellent Has religious affiliation
## 2          Good          Good          Don't know
## 3          Very good          Good Has religious affiliation
## 4          Very good          Very good Has religious affiliation
## 5          Good          Good Has religious affiliation
## 6          Excellent          Very good Has religious affiliation
## religionImportance languageHome          languageKnowledge
## 1 Somewhat important          French          French only
## 2          Don't know          English          English only

```

## 3	Very important	French Both English and French	
## 4	Not at all important	English English only	
## 5	Not at all important	French Both English and French	
## 6	Very important	French French only	
##	income_family	income_respondent	
## 1	\$25,000 to \$49,999	\$25,000 to \$49,999	
## 2	\$75,000 to \$99,999	Less than \$25,000	
## 3	\$75,000 to \$99,999	\$25,000 to \$49,999	
## 4	\$100,000 to \$124,999	\$50,000 to \$74,999	
## 5	\$50,000 to \$74,999	Less than \$25,000	
## 6	\$50,000 to \$74,999	Less than \$25,000	
##		occupation	childcare_regular
## 1	Sales and service occupations		<NA>
## 2	Trades, transport and equipment operators and related oc...		<NA>
## 3		<NA>	<NA>
## 4		<NA>	<NA>
## 5	Sales and service occupations		<NA>
## 6		<NA>	<NA>
##	childcare_type	childcare_monthly_cost	ever_fathered_child ever_given_birth
## 1	<NA>	<NA>	<NA> Yes
## 2	<NA>	<NA>	Yes <NA>
## 3	<NA>	<NA>	<NA> Yes
## 4	<NA>	<NA>	<NA> Yes
## 5	<NA>	<NA>	No <NA>
## 6	<NA>	<NA>	<NA> Yes
##	number_of_current_union	lives_with_partner	children_in_household
## 1	<NA>	No	No child
## 2	<NA>	No	No child
## 3	<NA>	No	No child
## 4	<NA>	No	No child
## 5	Second union	Yes	No child
## 6	<NA>	No	No child
##	number_total_children_intention	has_grandchildren	grandparents_still_living
## 1	NA	No	No
## 2	NA	Yes	No
## 3	NA	Yes	No
## 4	NA	No	No
## 5	2	No	Yes
## 6	NA	Yes	No
##	ever_married	current_marriage_is_first	number_marriages
## 1	No	<NA>	0
## 2	Yes	Yes	1
## 3	Yes	Yes	1
## 4	Yes	Yes	1
## 5	No	<NA>	0
## 6	Yes	Yes	1
##	religion_participation	partner_location_residence	full_part_time_work
## 1	Once or twice a year	In the same province	<NA>
## 2	Don't know	<NA>	<NA>
## 3	At least once a week	<NA>	<NA>
## 4	Not at all	<NA>	<NA>
## 5	Not at all	<NA>	<NA>
## 6	Not at all	<NA>	<NA>
##	time_off_work_birth	reason_no_time_off_birth	returned_same_job

```

## 1          <NA>          <NA>          <NA>
## 2          <NA>          <NA>          <NA>
## 3          <NA>          <NA>          <NA>
## 4          <NA>          <NA>          <NA>
## 5          <NA>          <NA>          <NA>
## 6          <NA>          <NA>          <NA>
##   satisfied_time_children provide_or_receive_fin_supp fin_supp_child_supp
## 1          <NA>          <NA>          NA
## 2          <NA>          <NA>          NA
## 3          <NA>          <NA>          NA
## 4          <NA>          <NA>          NA
## 5          <NA>          <NA>          NA
## 6          <NA>          <NA>          NA
##   fin_supp_child_exp fin_supp_lump fin_supp_other fin_supp_agreement
## 1          NA          NA          NA          <NA>
## 2          NA          NA          NA          <NA>
## 3          NA          NA          NA          <NA>
## 4          NA          NA          NA          <NA>
## 5          NA          NA          NA          <NA>
## 6          NA          NA          NA          <NA>
##   future_children_intention is_male main_activity
## 1          <NA>          0          NA
## 2          <NA>          1          NA
## 3          <NA>          0          NA
## 4          <NA>          0          NA
## 5          <NA>          1          NA
## 6          <NA>          0          NA
##                                     age_diff number_total_children_known
## 1                                     <NA>          0
## 2      Respondent is 4 years older          0
## 3      Respondent is 3 years older          0
## 4 Respondent and spouse/partner are same age          0
## 5                                     <NA>          1
## 6      Respondent is 1 year older          0

```

Let's check all the column names in the dataset

```
names(df)
```

```

## [1] "caseid"          "age"
## [3] "age_first_child" "age_youngest_child_under_6"
## [5] "total_children"  "age_start_relationship"
## [7] "age_at_first_marriage" "age_at_first_birth"
## [9] "distance_between_houses" "age_youngest_child_returned_work"
## [11] "feelings_life"      "sex"
## [13] "place_birth_canada" "place_birth_father"
## [15] "place_birth_mother" "place_birth_macro_region"
## [17] "place_birth_province" "year_arrived_canada"
## [19] "province"          "region"
## [21] "pop_center"        "marital_status"
## [23] "aboriginal"        "vis_minority"
## [25] "age_immigration"    "landed_immigrant"
## [27] "citizenship_status" "education"

```

```

## [29] "own_rent" "living_arrangement"
## [31] "hh_type" "hh_size"
## [33] "partner_birth_country" "partner_birth_province"
## [35] "partner_vis_minority" "partner_sex"
## [37] "partner_education" "average_hours_worked"
## [39] "worked_last_week" "partner_main_activity"
## [41] "self_rated_health" "self_rated_mental_health"
## [43] "religion_has_affiliation" "religion_importance"
## [45] "language_home" "language_knowledge"
## [47] "income_family" "income_respondent"
## [49] "occupation" "childcare_regular"
## [51] "childcare_type" "childcare_monthly_cost"
## [53] "ever_fathered_child" "ever_given_birth"
## [55] "number_of_current_union" "lives_with_partner"
## [57] "children_in_household" "number_total_children_intention"
## [59] "has_grandchildren" "grandparents_still_living"
## [61] "ever_married" "current_marriage_is_first"
## [63] "number_marriages" "religion_participation"
## [65] "partner_location_residence" "full_part_time_work"
## [67] "time_off_work_birth" "reason_no_time_off_birth"
## [69] "returned_same_job" "satisfied_time_children"
## [71] "provide_or_receive_fin_supp" "fin_supp_child_supp"
## [73] "fin_supp_child_exp" "fin_supp_lump"
## [75] "fin_supp_other" "fin_supp_agreement"
## [77] "future_children_intention" "is_male"
## [79] "main_activity" "age_diff"
## [81] "number_total_children_known"

```

As we see there are 81 total columns.

Data Summary

```
summary(df)
```

```

##      caseid      age  age_first_child age_youngest_child_under_6
##  Min.   :    1  Min.   :15.00  Min.   : 0.00  Min.   :0.000
## 1st Qu.: 5151 1st Qu.:37.30 1st Qu.:15.00 1st Qu.:1.000
## Median :10302 Median :54.20 Median :32.00 Median :2.000
## Mean   :10302 Mean   :52.19 Mean   :30.57 Mean   :2.412
## 3rd Qu.:15452 3rd Qu.:66.78 3rd Qu.:44.00 3rd Qu.:4.000
## Max.   :20602 Max.   :80.00 Max.   :60.00 Max.   :5.000
##                      NA's   :6835  NA's   :18488
## total_children age_start_relationship age_at_first_marriage
##  Min.   :0.000  Min.   :18.00  Min.   :15.0
## 1st Qu.:0.000 1st Qu.:25.00 1st Qu.:20.5
## Median :2.000 Median :30.50  Median :22.8
## Mean   :1.679 Mean   :33.63  Mean   :24.1
## 3rd Qu.:3.000 3rd Qu.:40.62 3rd Qu.:26.4
## Max.   :7.000 Max.   :60.00  Max.   :50.0
## NA's   :19    NA's   :18566  NA's   :15248
## age_at_first_birth distance_between_houses age_youngest_child_returned_work
##  Min.   :18.00  Min.   : 0.00  Min.   : 0.200
## 1st Qu.:22.80 1st Qu.: 4.00 1st Qu.: 0.500

```

```

## Median :26.40      Median :10.00      Median : 6.000
## Mean :26.86      Mean :17.13      Mean : 6.589
## 3rd Qu.:30.30      3rd Qu.:24.75      3rd Qu.:12.000
## Max. :45.00      Max. :90.00      Max. :48.000
## NA's :7865      NA's :19476      NA's :19466
## feelings_life      sex      place_birth_canada place_birth_father
## Min. : 0.000      Length:20602      Length:20602      Length:20602
## 1st Qu.: 7.000      Class :character      Class :character      Class :character
## Median : 8.000      Mode :character      Mode :character      Mode :character
## Mean : 8.094
## 3rd Qu.: 9.000
## Max. :10.000
## NA's :271
## place_birth_mother place_birth_macro_region place_birth_province
## Length:20602      Length:20602      Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
##
## year_arrived_canada province      region      pop_center
## Length:20602      Length:20602      Length:20602      Length:20602
## Class :character      Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character      Mode :character
##
##
##
##
## marital_status      aboriginal      vis_minority      age_immigration
## Length:20602      Length:20602      Length:20602      Length:20602
## Class :character      Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character      Mode :character
##
##
##
##
## landed_immigrant      citizenship_status education      own_rent
## Length:20602      Length:20602      Length:20602      Length:20602
## Class :character      Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character      Mode :character
##
##
##
##
## living_arrangement      hh_type      hh_size      partner_birth_country
## Length:20602      Length:20602      Min. :1.000      Length:20602
## Class :character      Class :character      1st Qu.:1.000      Class :character
## Mode :character      Mode :character      Median :2.000      Mode :character
##
##      Mean :2.347
##      3rd Qu.:3.000
##      Max. :6.000
##
##
## partner_birth_province partner_vis_minority partner_sex

```



```

## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
## partner_education average_hours_worked worked_last_week
## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
## partner_main_activity selfRated_health selfRated_mental_health
## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
## religion_has_affiliation religion_importance language_home
## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
## language_knowledge income_family income_respondent occupation
## Length:20602          Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character      Mode :character
##
##
##
## childcare_regular childcare_type childcare_monthly_cost
## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##
## ever_fathered_child ever_given_birth number_of_current_union
## Length:20602          Length:20602          Length:20602
## Class :character      Class :character      Class :character
## Mode :character      Mode :character      Mode :character
##
##
##

```

```

##
## lives_with_partner children_in_household number_total_children_intention
## Length:20602      Length:20602      Min.   :0.000
## Class :character   Class :character   1st Qu.:0.000
## Mode  :character   Mode  :character   Median :0.000
##                                     Mean  :0.903
##                                     3rd Qu.:2.000
##                                     Max.   :4.000
##                                     NA's   :12202
## has_grandchildren  grandparents_still_living ever_married
## Length:20602      Length:20602      Length:20602
## Class :character   Class :character   Class :character
## Mode  :character   Mode  :character   Mode  :character
##
##
##
## current_marriage_is_first number_marriages religion_participation
## Length:20602      Min.   :0.0000   Length:20602
## Class :character   1st Qu.:0.0000   Class :character
## Mode  :character   Median :1.0000   Mode  :character
##                                     Mean  :0.7989
##                                     3rd Qu.:1.0000
##                                     Max.   :4.0000
##
##
## partner_location_residence full_part_time_work time_off_work_birth
## Length:20602      Length:20602      Length:20602
## Class :character   Class :character   Class :character
## Mode  :character   Mode  :character   Mode  :character
##
##
##
## reason_no_time_off_birth returned_same_job satisfied_time_children
## Length:20602      Length:20602      Length:20602
## Class :character   Class :character   Class :character
## Mode  :character   Mode  :character   Mode  :character
##
##
##
## provide_or_receive_fin_supp fin_supp_child_supp fin_supp_child_exp
## Length:20602      Min.   :0.000   Min.   :0.000
## Class :character   1st Qu.:1.000   1st Qu.:0.000
## Mode  :character   Median :1.000   Median :0.000
##                                     Mean  :0.765   Mean  :0.339
##                                     3rd Qu.:1.000   3rd Qu.:1.000
##                                     Max.   :1.000   Max.   :1.000
##                                     NA's   :20057   NA's   :20057
## fin_supp_lump      fin_supp_other fin_supp_agreement future_children_intention
## Min.   :0.000      Min.   :0.000   Length:20602      Length:20602
## 1st Qu.:0.000      1st Qu.:0.000   Class :character   Class :character
## Median :0.000      Median :0.000   Mode  :character   Mode  :character
## Mean   :0.055      Mean   :0.055

```

```
## 3rd Qu.:0.000 3rd Qu.:0.000
## Max. :1.000 Max. :1.000
## NA's :20057 NA's :20057
## is_male main_activity age_diff number_total_children_known
## Min. :0.0000 Mode:logical Length:20602 Min. :0.0000
## 1st Qu.:0.0000 NA's:20602 Class :character 1st Qu.:0.0000
## Median :0.0000 Mode :character Median :0.0000
## Mean :0.4562 Mean :0.4123
## 3rd Qu.:1.0000 3rd Qu.:1.0000
## Max. :1.0000 Max. :1.0000
##
```

Model

We construct linear regression model between the following variables: $\text{income} \sim \text{age, education, sex, province, occupation}$

```
###model <- lm(income_family ~ age + education + sex + province + occupation, data = df)
```

Results

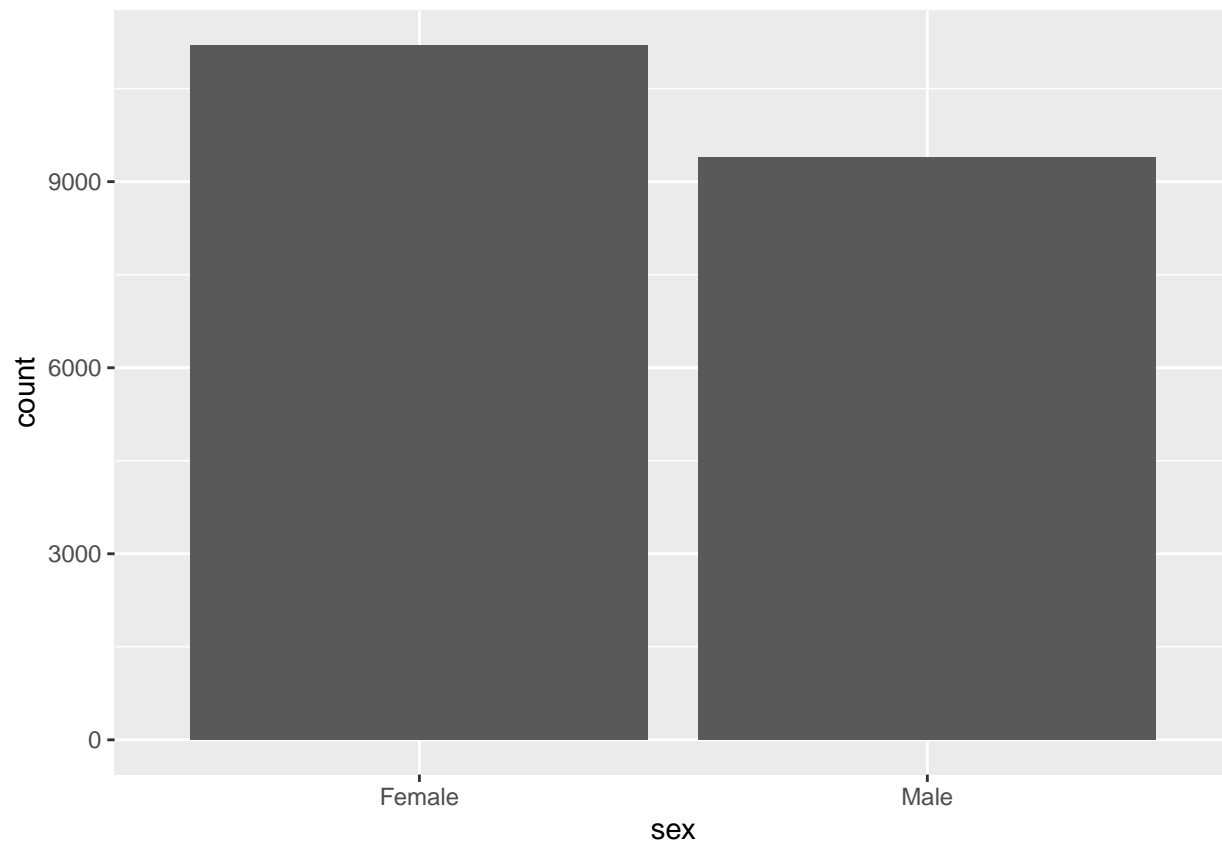
```
summary(df$age)
```

```
## Min. 1st Qu. Median Mean 3rd Qu. Max.
## 15.00 37.30 54.20 52.19 66.78 80.00
```

```
table(df$sex)
```

```
##
## Female Male
## 11203 9399
```

```
ggplot(data = df) +
  geom_bar(mapping = aes(x = sex))
```

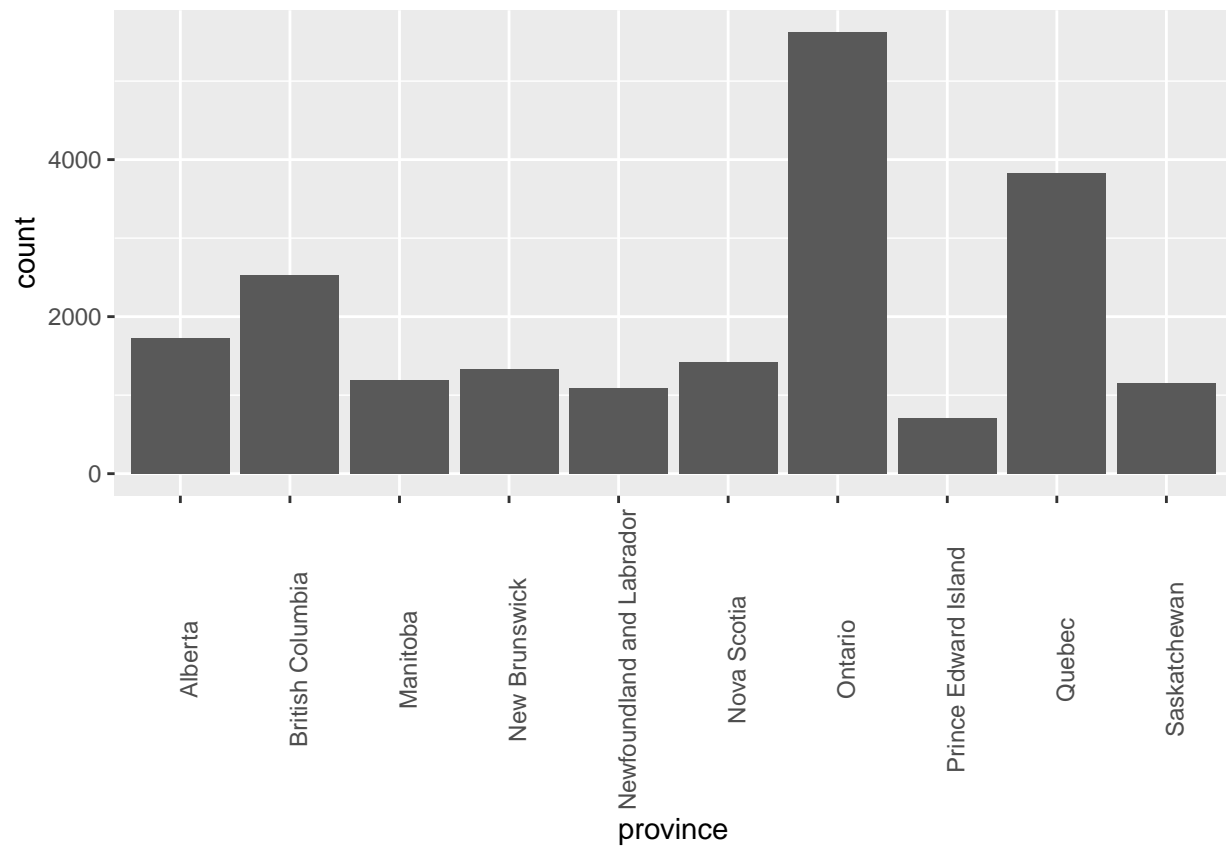


Number of respondents per province

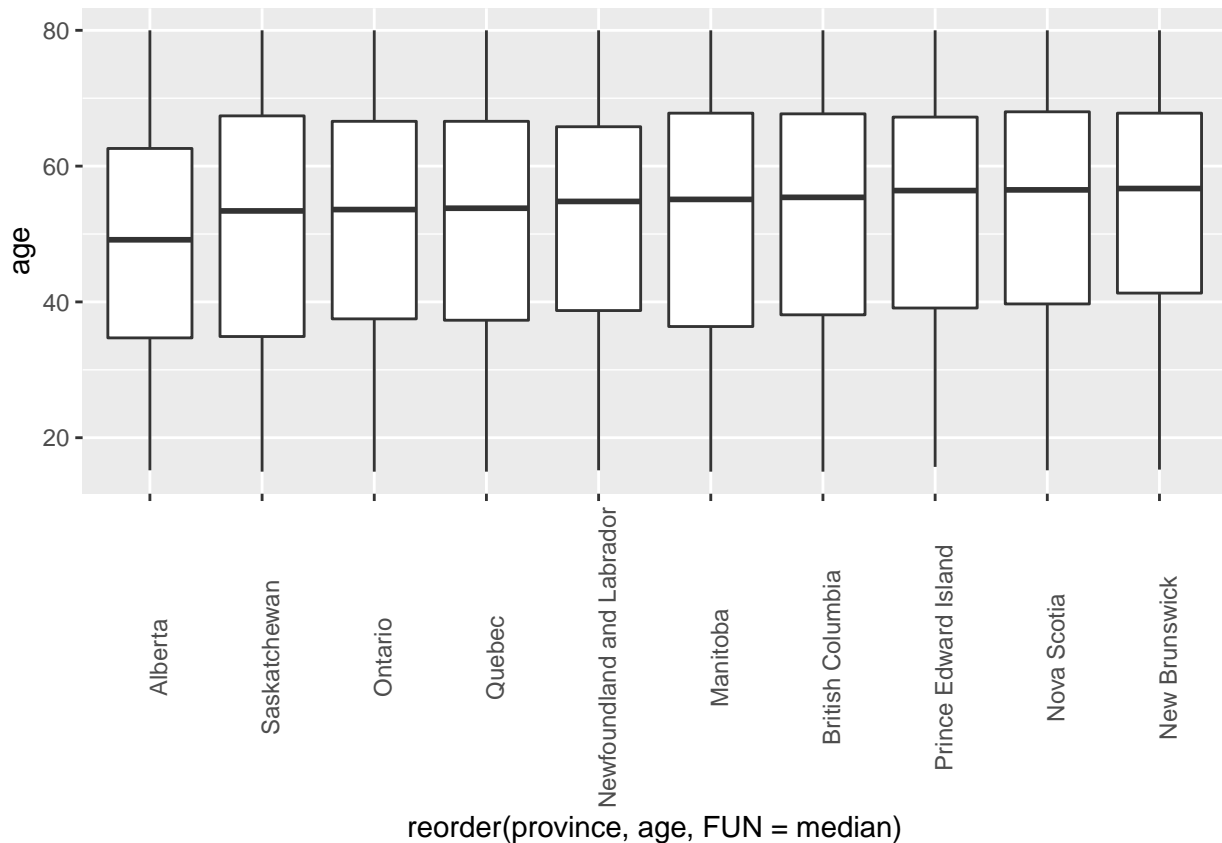
```
table(df$province)
```

```
##
##           Alberta      British Columbia      Manitoba
##           1728           2522           1192
##      New Brunswick Newfoundland and Labrador      Nova Scotia
##           1337           1094           1425
##           Ontario      Prince Edward Island      Quebec
##           5621           708           3822
##           Saskatchewan
##           1153
```

```
ggplot(data = df) +
  geom_bar(mapping = aes(x = province)) +
  theme(axis.text.x = element_text(angle = 90))
```



```
ggplot(data = df) +
  geom_boxplot(mapping = aes(x = reorder(province, age, FUN = median), y = age)) +
  theme(axis.text.x = element_text(angle = 90))
```

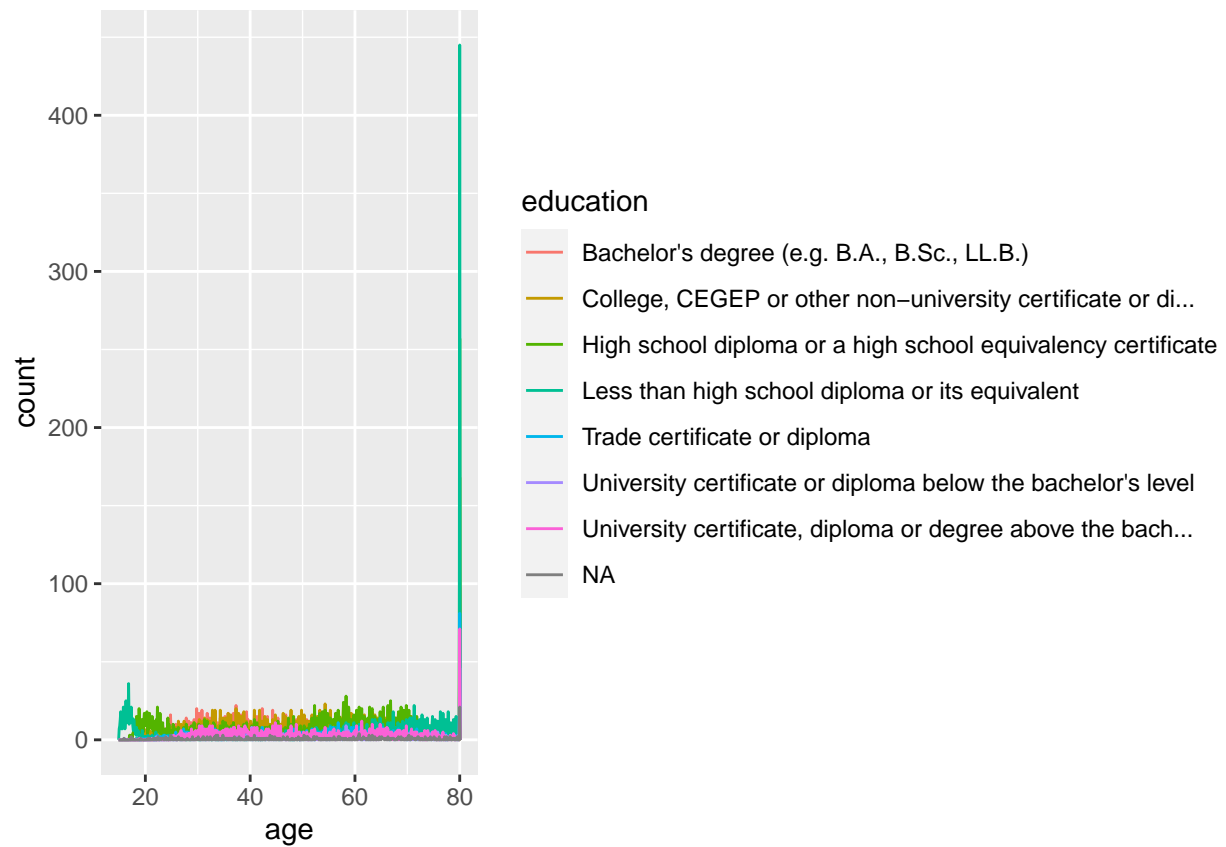


Education status of respondents

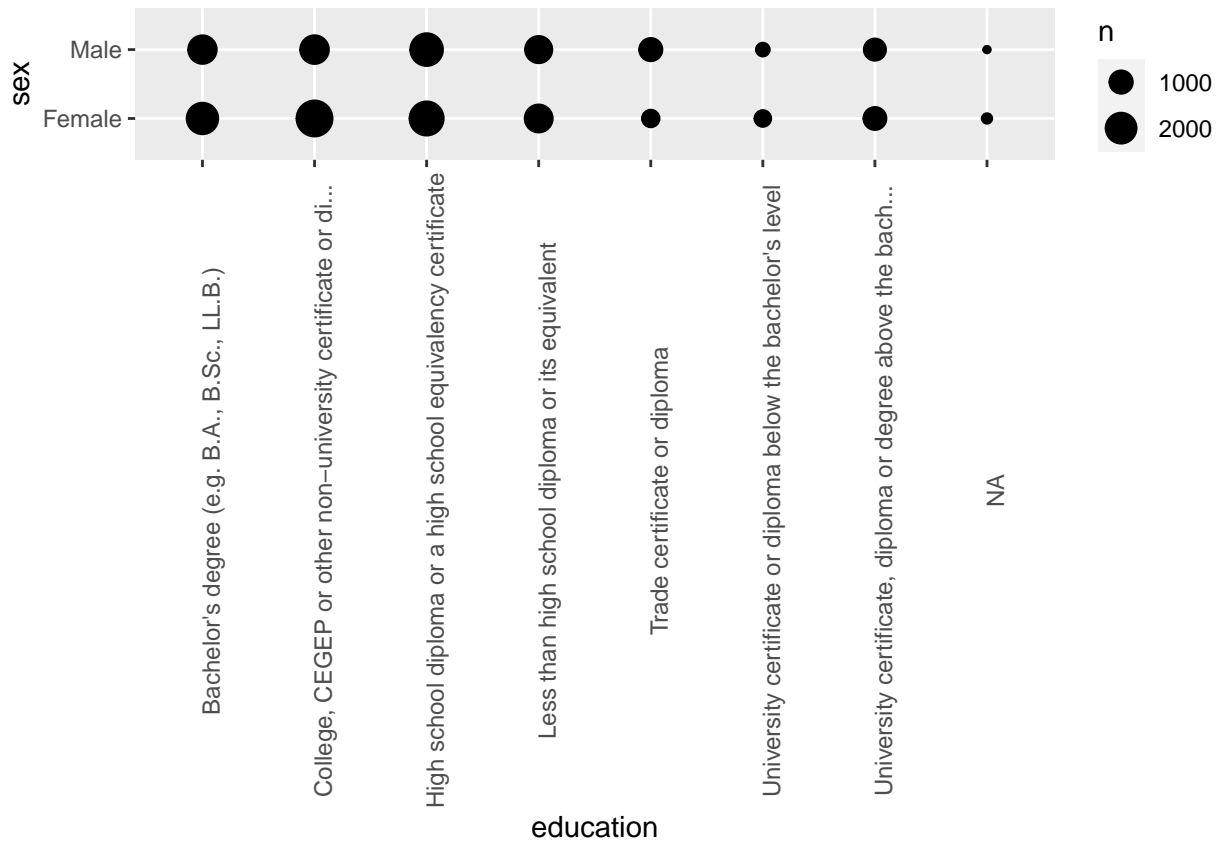
```
table(df$education)
```

```
##
##           Bachelor's degree (e.g. B.A., B.Sc., LL.B.)
##                                     3753
## College, CEGEP or other non-university certificate or di...
##                                     4566
## High school diploma or a high school equivalency certificate
##                                     4848
##           Less than high school diploma or its equivalent
##                                     3036
##           Trade certificate or diploma
##                                     1483
## University certificate or diploma below the bachelor's level
##                                     732
## University certificate, diploma or degree above the bach...
##                                     1843
```

```
ggplot(data = df, mapping = aes(x = age, colour = education)) +
  geom_freqpoly(binwidth = 0.1)
```



```
ggplot(data = df) +
  geom_count(mapping = aes(x = education, y = sex)) +
  theme(axis.text.x = element_text(angle = 90))
```



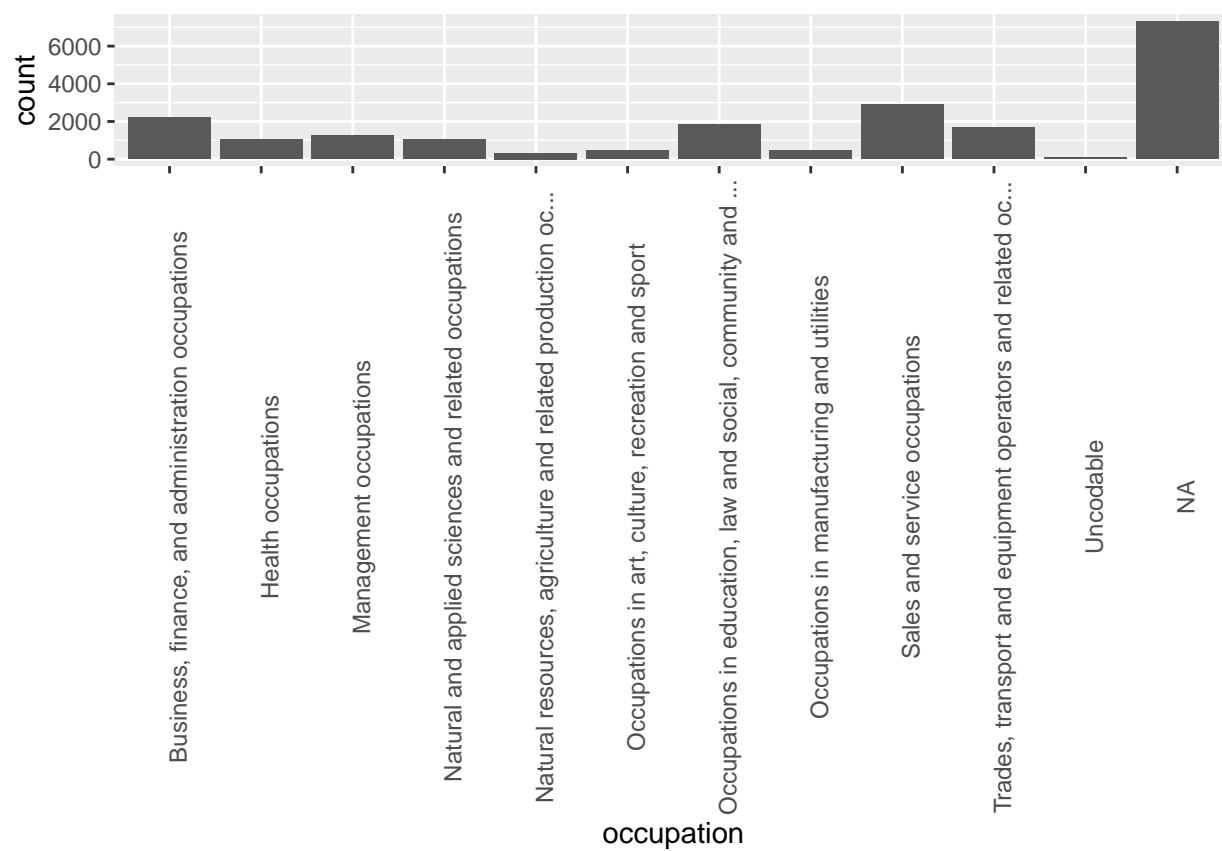
```
table(df$occupation)
```

```
##
##      Business, finance, and administration occupations
##                                     2205
##              Health occupations
##                                     1038
##      Management occupations
##                                     1242
##      Natural and applied sciences and related occupations
##                                     1043
## Natural resources, agriculture and related production oc...
##                                     337
##      Occupations in art, culture, recreation and sport
##                                     452
## Occupations in education, law and social, community and ...
##                                     1835
##      Occupations in manufacturing and utilities
##                                     474
##      Sales and service occupations
##                                     2912
## Trades, transport and equipment operators and related oc...
##                                     1694
##                                     Uncodable
##                                     73
```

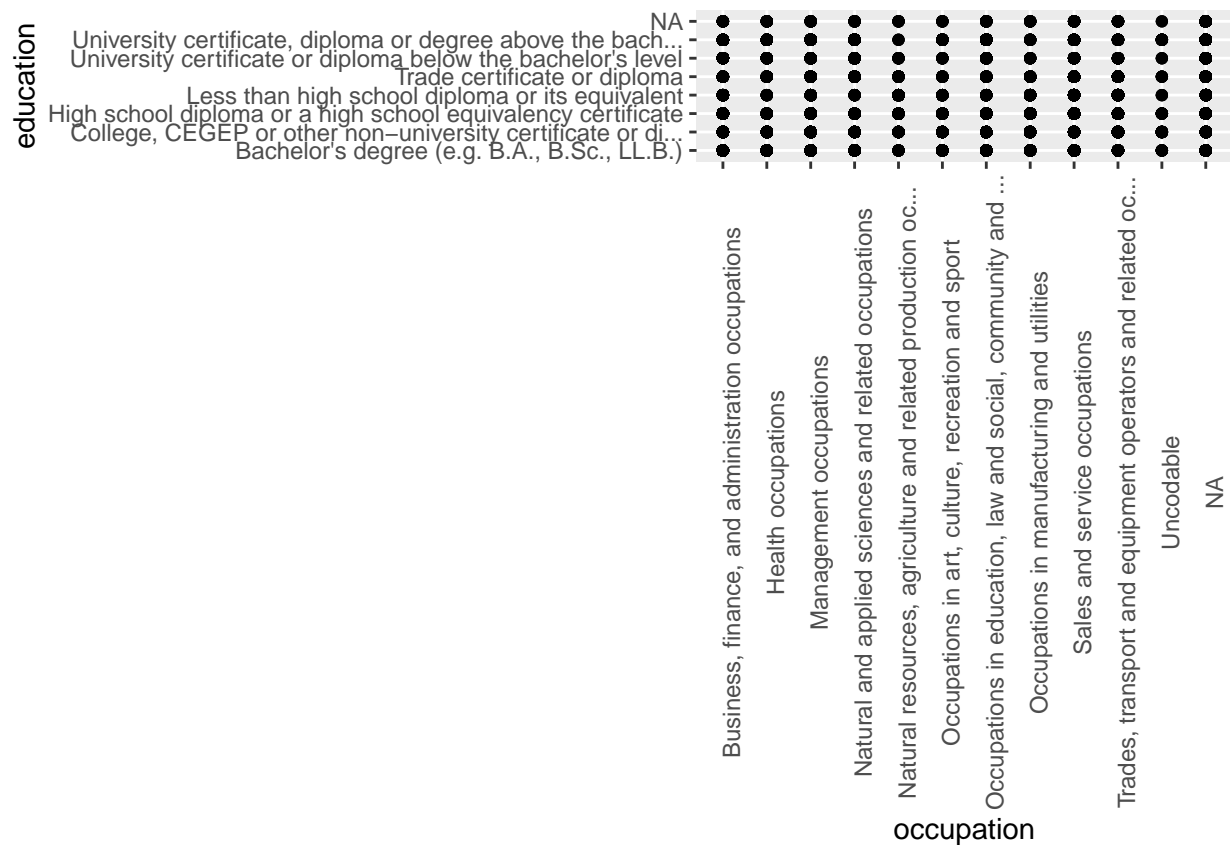
```
ggplot(data = df) +
  geom_bar(mapping = aes(x = occupation)) +
```



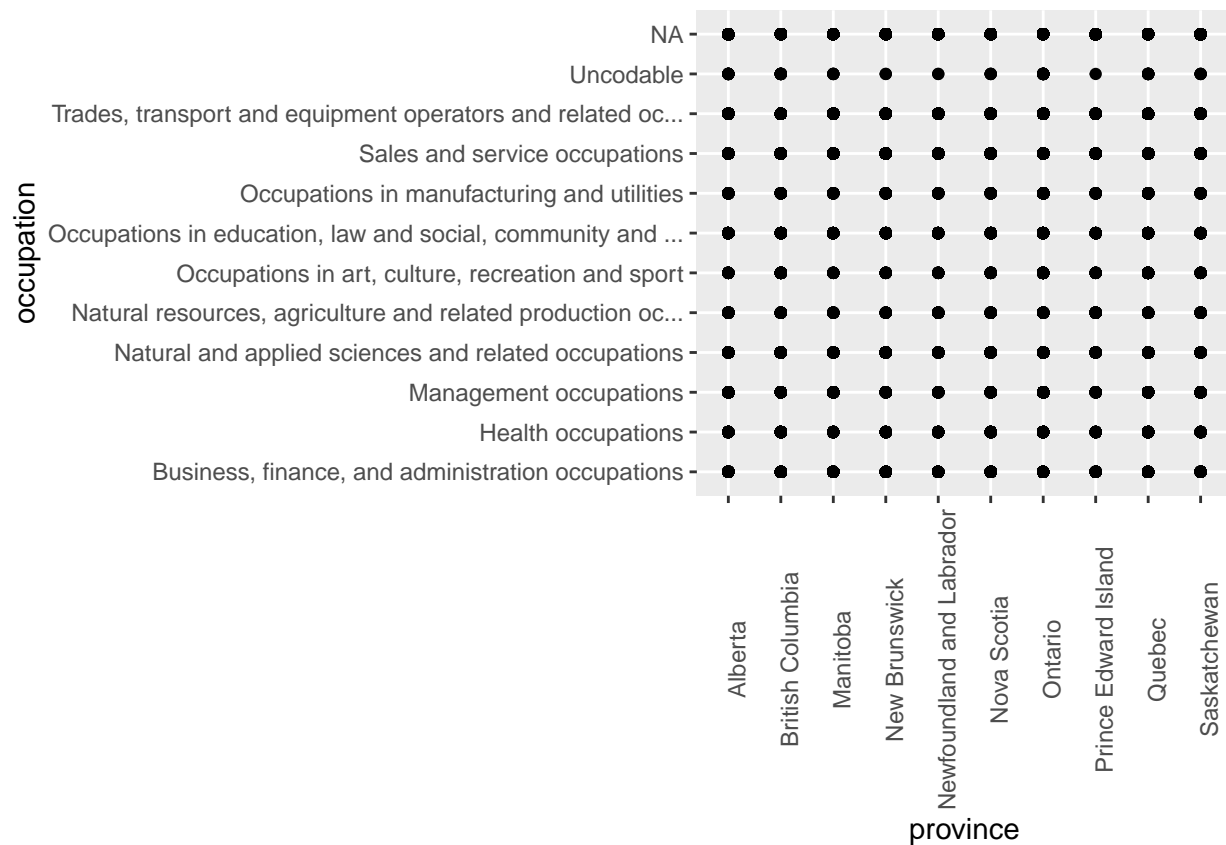
```
theme(axis.text.x = element_text(angle = 90))
```



```
ggplot(data = df) +  
  geom_point(mapping = aes(y = education, x = occupation)) +  
  theme(axis.text.x = element_text(angle = 90))
```



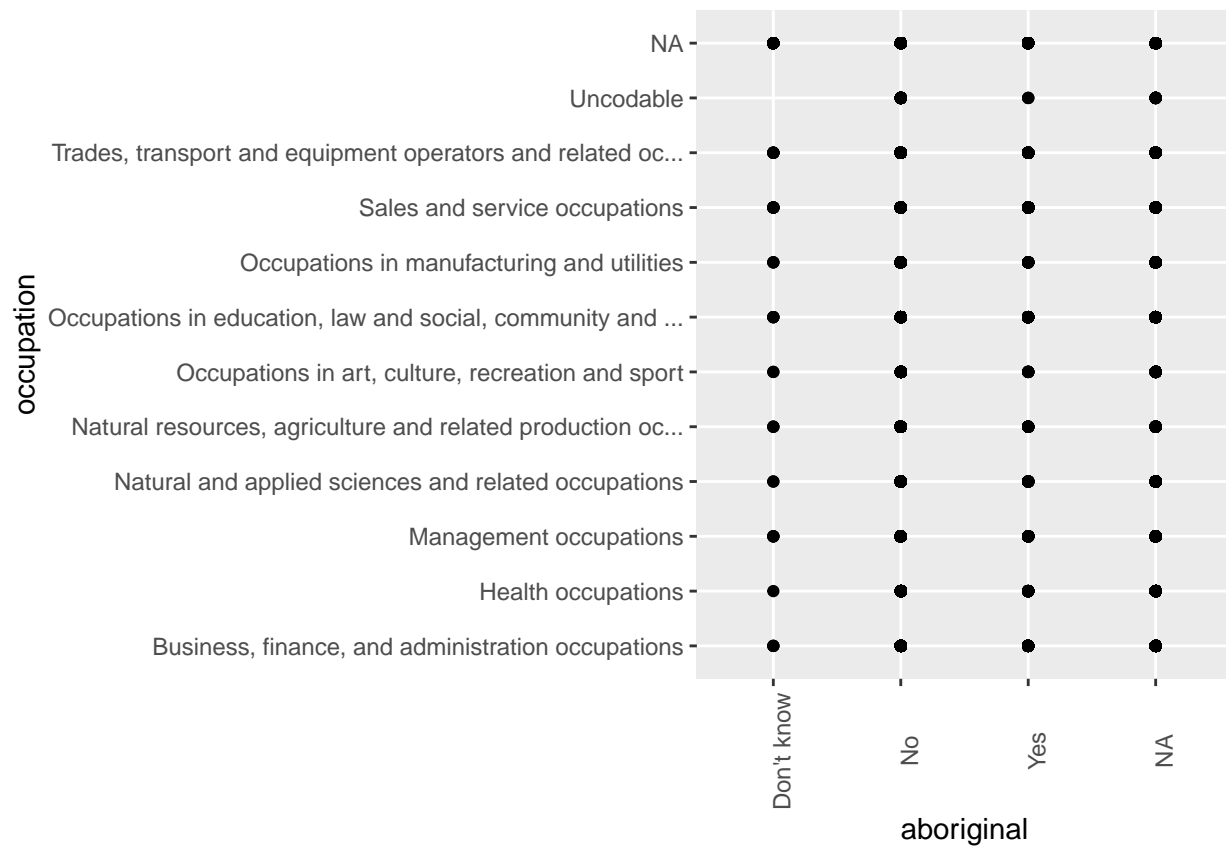
```
ggplot(data = df) +
  geom_point(mapping = aes(x = province, y = occupation)) +
  theme(axis.text.x = element_text(angle = 90))
```



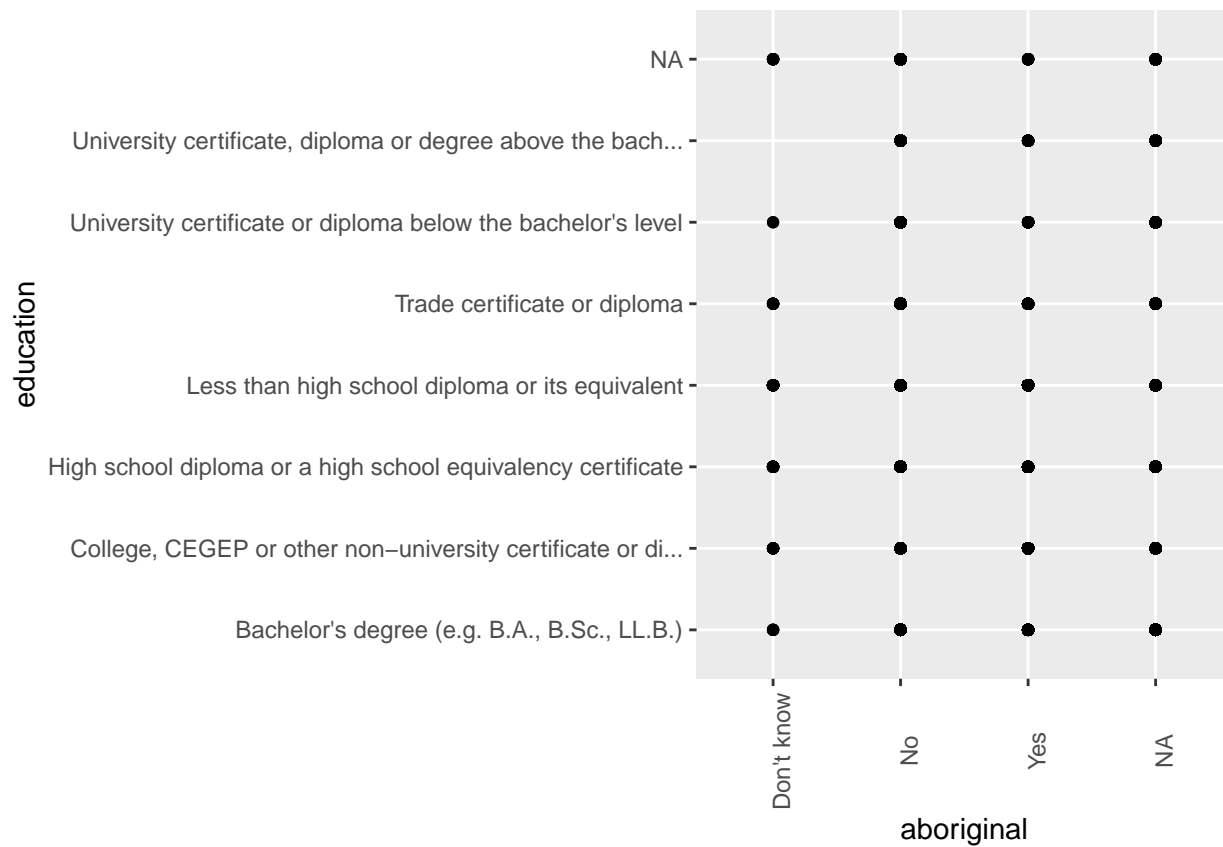
```
table(df$aboriginal)
```

```
##
## Don't know      No      Yes
##           86    15869    792
```

```
ggplot(data = df) +
  geom_point(mapping = aes(x = aboriginal, y = occupation)) +
  theme(axis.text.x = element_text(angle = 90))
```

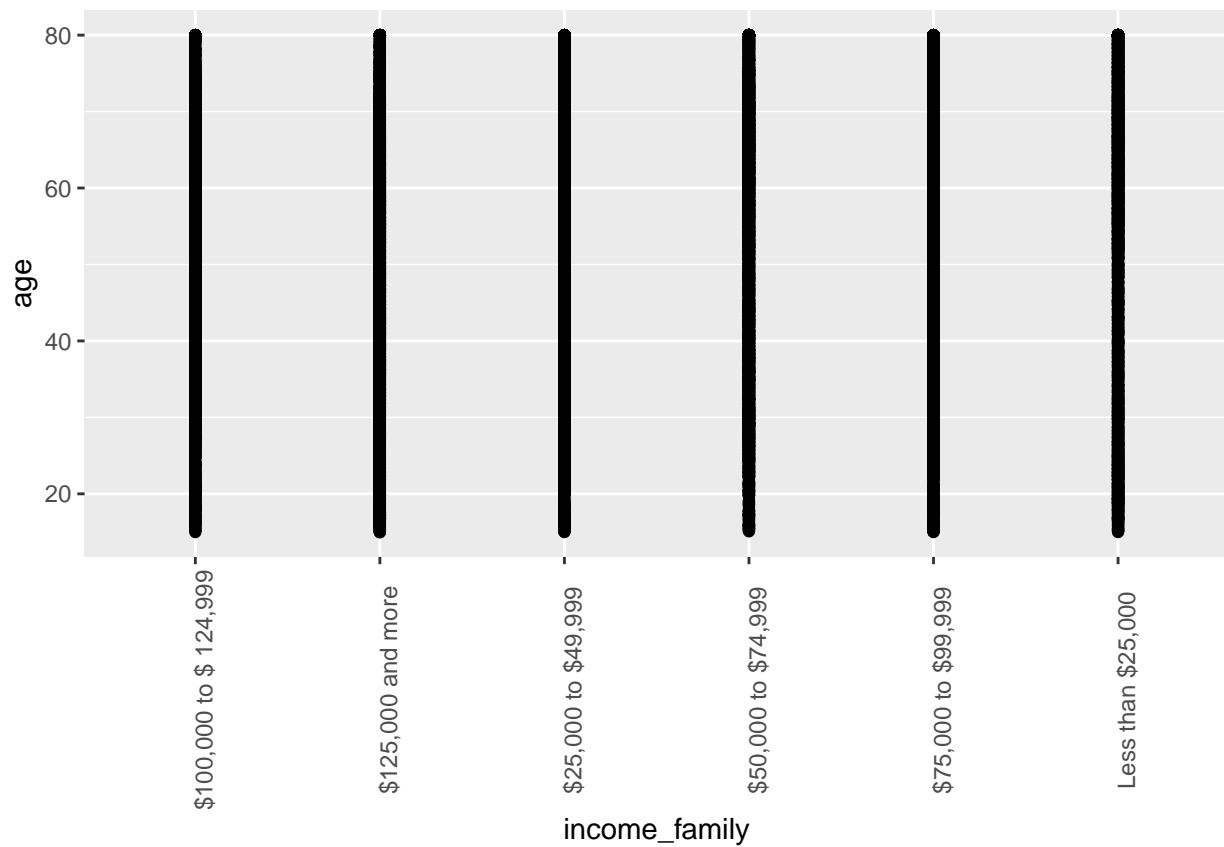


```
ggplot(data = df) +
  geom_point(mapping = aes(x = aboriginal, y = education)) +
  theme(axis.text.x = element_text(angle = 90))
```



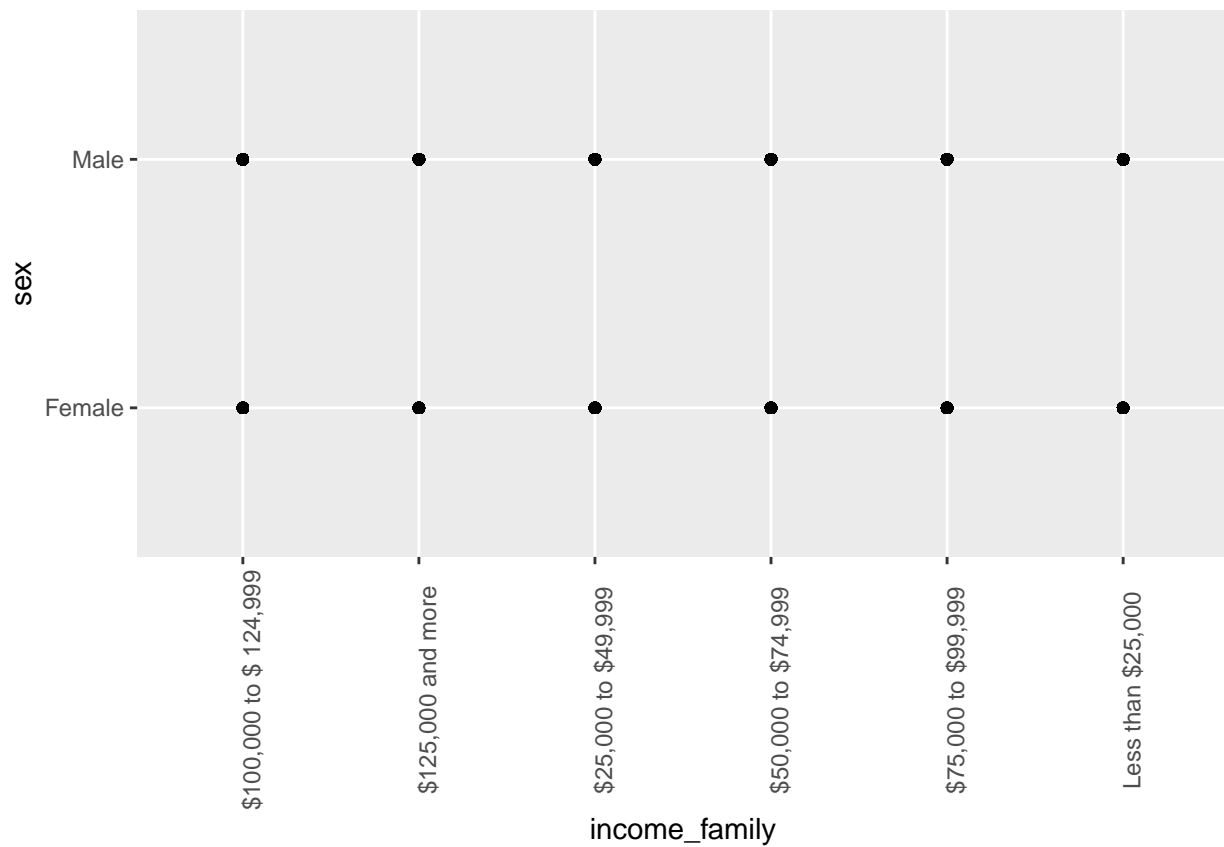
Relationship between income and age

```
ggplot(data = df) +  
  geom_point(mapping = aes(x = income_family, y = age)) +  
  theme(axis.text.x = element_text(angle = 90))
```



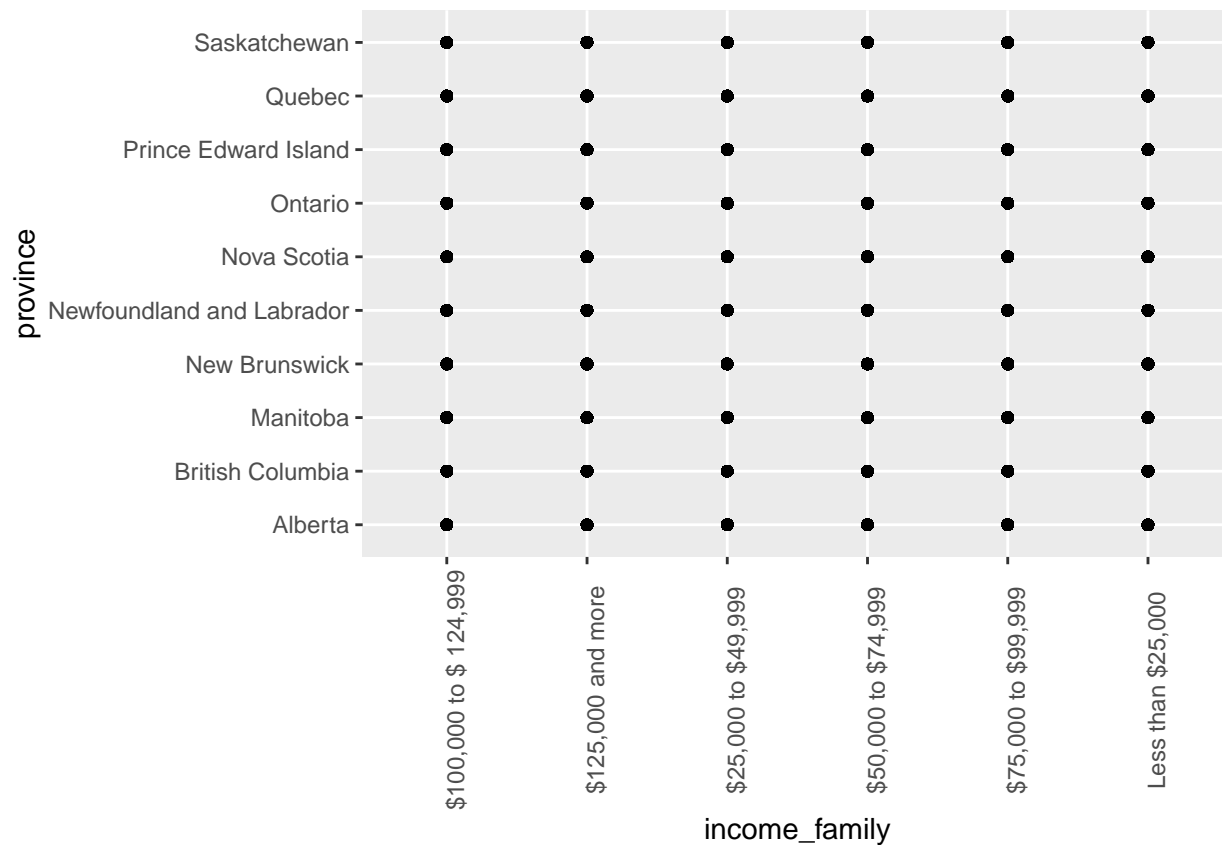
Relationship between income and sex

```
ggplot(data = df) +  
  geom_point(mapping = aes(x = income_family, y = sex)) +  
  theme(axis.text.x = element_text(angle = 90))
```



Relationship between income and province

```
ggplot(data = df) +
  geom_point(mapping = aes(x = income_family, y = province)) +
  theme(axis.text.x = element_text(angle = 90))
```



Discussion

We see that minimum age of the respondents is 15, mean age is 52.19, and maximum age is 80.

We see that there are overall 11203 female respondents and 9388 male respondents.

References

Statistics Canada <https://www150.statcan.gc.ca/n1/pub/89f0115x/89f0115x2019001-eng.htm>