Codes used to generate the tables and analyses analyzed in the research

Table of Content

Table 1:

```
library(dplyr) library(knitr)

voting_counts <- c( "Liberal Party" = 890,
"Conservative Party" = 3637, "NDP" = 2828
)
voting_data <- as.data.frame(voting_counts)


colnames(voting_data) <- c("Frequency") voting_data$Category <- rownames(voting_data)
rownames(voting_data) <- NULL

voting_data <- voting_data %>%
mutate(Percent = round(Frequency / sum(Frequency) * 100, 2), Cumulative_Percent =
round(cumsum(Percent), 2))

voting_data <- voting_data %>%
select(Category, Frequency, Percent, Cumulative_Percent)


print(kable(voting_data, caption = "Frequency Table of Voting Parties"))
```

Table 2:

```
library(dplyr) library(knitr)

cps21_spend_data <- data.frame(
Category = c("Spending Less", "Spending the Same", "Spending More"),

Frequency = c(633, 2562, 6925)
)


cps21_spend_data <- cps21_spend_data %>%
mutate(Percent = round(Frequency / sum(Frequency) * 100, 2), Cumulative_Percent =
round(cumsum(Percent), 2))



print(kable(cps21_spend_data, caption = "Frequency Table for Affordable Housing Spending
Responses"))
```

Table 3:

```
library(dplyr) library(knitr)

categories <- c("Spending Less", "Spending the Same", "Spending More") frequencies <-
c(823, 7176, 12200)
```

```
cps21_data <- data.frame(Category = categories, Frequency = frequencies)


cps21_data <- cps21_data %>%
mutate(Percent = round(Frequency / sum(Frequency) * 100, 2), Cumulative_Percent =
round(cumsum(Percent), 2))

print(kable(cps21_data, caption = "Frequency Table for Spend on Education"))
```

Table 4: library(dplyr) library(knitr)

```
gender_data <- data.frame(

Gender = c("Man", "Woman"), Frequency = c(9474, 11370)
)


gender_data <- gender_data %>%
mutate(Percent = round(Frequency / sum(Frequency) * 100, 2), Cumulative_Percent =
round(cumsum(Percent), 2))

gender_data <- gender_data %>%
select(Gender, Frequency, Percent, Cumulative_Percent)


print(kable(gender_data, caption = "Frequency Table for Gender"))
```

Table 5:

```
summary_stats <- summary(mydata11$cps21_spend_educ) sd_educ <-
sd(mydata11$cps21_spend_educ, na.rm = TRUE) summary_table <- data.frame(
Statistic = c("Min", "1st Qu.", "Median", "Mean", "3rd Qu.", "Max", "Standard Deviation"),
Value = c(summary_stats, sd_educ)
)
print(summary_table) library(knitr)
kable(summary_table, caption = "Summary Statistics for Education Spending") library(knitr)
formatted_table <- data.frame(
Statistic = c("Min", "1st Qu.", "Median", "Mean", "3rd Qu.", "Max", "Standard Deviation"),
Value = round(c(summary_stats, sd_educ), 2)
)
kable(formatted_table, caption = "Summary Statistics for Education Spending")
```

Table: 6

```
summary_stats <- summary(mydata11$cps21_spend_afford_h)
sd_afford_h <- round(sd(mydata11$cps21_spend_afford_h, na.rm = TRUE), 2)
summary_table <- data.frame(
Statistic = c("Minimum", "1st Quartile", "Median", "Mean", "3rd Quartile", "Maximum",
```

```
"Standard Deviation"),
Value = round(c(summary_stats[1], summary_stats[2], summary_stats[3], summary_stats[4],
summary_stats[5], summary_stats[6], sd_afford_h), 2)
)
print(summary_table) library(knitr)
kable(summary_table, caption = "Summary Statistics for Housing Spending")


Boxplot of education spending:
boxplot(mydata11$cps21_spend_educ, main = "Boxplot of Education Spending", ylab =
"Spending")


Histogram of housing spending:
hist(mydata11$cps21_spend_afford_h, main = "Histogram of Housing Spending", xlab =
"Spending", breaks = 10)
```

Table 7:

```
sd_votechoice <- sd(mydata11$cps21_votechoice, na.rm = TRUE) cat("Standard Deviation
for Vote Choice: ", round(sd_votechoice, 2), "\n") summary_stats_votechoice <-
summary(mydata11$cps21_votechoice) summary_table_votechoice <- data.frame(
Statistic = c("Minimum", "1st Quartile", "Median", "Mean", "3rd Quartile", "Maximum",
"Standard Deviation"),
Value = round(c( summary_stats_votechoice[1], summary_stats_votechoice[2],
summary_stats_votechoice[3], summary_stats_votechoice[4], summary_stats_votechoice[5],

summary_stats_votechoice[6], round(sd_votechoice, 2)
), 2)
)
print(summary_table_votechoice) install.packages("kableExtra") library(kableExtra)
summary_table_votechoice <- data.frame(
Statistic = c("Minimum", "1st Quartile", "Median", "Mean", "3rd Quartile", "Maximum",
"Standard Deviation"),
Value = round(c(1.00, 1.00, 2.00, 3.03, 4.00, 7.00, 2.02), 2)
)
summary_table_votechoice %>% kable() %>%
kable_styling(full_width = FALSE, position = "left") kable(summary_table_votechoice,
caption = "Summary Statistics for Voting Choice")




library(dplyr) library(ggplot2) library(haven)

mydata$pes21_rural_urban <- as_factor(mydata$pes21_rural_urban)


Distribution of Areas of living / barchart mydata <- mydata %>% mutate(living_area_group
= case_when(
```

```
pes21_rural_urban %in% c("1", "2", "3") ~ "Rural",          # Group 1, 2, 3 as Rural
pes21_rural_urban == "4" ~ "Suburb",                  # Group 4 as Suburb pes21_rural_urban
== "5" ~ "Urban",      # Group 5 as Urban

pes21_rural_urban == "6" ~ "Don't Know", # Group 6 as Don't Know TRUE ~ "Other"  #
Any other category as Other (optional)
))
table(mydata$living_area_group)


ggplot(mydata, aes(x = living_area_group, fill = living_area_group)) + geom_bar() + #
Create bars
scale_fill_brewer(palette = "Set3") + # Specify color palette labs(title = "Distribution of
Areas of Living",
x = "Areas of Living", y = "Count",
fill = "Living Area") +
theme_minimal() + # Apply minimal theme
theme(axis.text.x = element_text(angle = 45, hjust = 1)) # Rotate x-axis text for better
readability


Born in Canada /Frequency of Immigration status
library(dplyr) library(knitr)

mydata <- data.frame(
cps21_bornin_canada = c(rep(1, 8), rep(2, 3), rep(3, 1)) # 8 ones, 3 twos, and 1 three
)


summary_stats <- mydata %>% summarise(
Minimum = min(cps21_bornin_canada, na.rm = TRUE),
Q1 = quantile(cps21_bornin_canada, 0.25, na.rm = TRUE), # First quartile Median =
median(cps21_bornin_canada, na.rm = TRUE),
Mean = mean(cps21_bornin_canada, na.rm = TRUE),
Q3 = quantile(cps21_bornin_canada, 0.75, na.rm = TRUE), # Third quartile Maximum =
max(cps21_bornin_canada, na.rm = TRUE),

Standard_Deviation = sd(cps21_bornin_canada, na.rm = TRUE)
)
print(kable(summary_stats, caption = "Summary Statistics for Immigration Status (Born in
Canada)"))


Vote choice distribution
barplot(vote_counts, main = "Vote Choice Distribution", xlab = "Vote Choice", ylab =
"Frequency")
```

Table 8:

```
cont_table1 <- table(mydata$cps21_genderid, mydata$vcps21_votechoice,
mydata$cps21_spend_educ)
cont_df <- as.data.frame(cont_table1)
colnames(cont_df) <- c("Gender", "VoteChoice", "SpendEducation", "Frequency") cont_df
<- cont_df %>%
group_by(Gender, VoteChoice) %>%
mutate(Percent = Frequency / sum(Frequency) * 100, Cumulative_Freq =
cumsum(Frequency), Cumulative_Percent = cumsum(Percent))
print(kable(cont_df, caption = "Cumulative Association Table for Gender, Voting Choice,
and Spending on Education"))
```

Table 9:

```
mydata <- mydata %>% mutate(
Gender = as.numeric(factor(cps21_genderid, levels = c("Man", "Woman"))),
VoteChoice = as.numeric(factor(vcps21_votechoice, levels = c("Liberal Party",
"Conservative Party", "NDP"))),
SpendHouse = as.numeric(factor(cps21_spend_afford_h, levels = c("Less", "Same",
"More")))
)
print(head(mydata))
cont_table <- table(mydata$Gender, mydata$VoteChoice, mydata$SpendHouse) cont_df <-
as.data.frame(cont_table)
colnames(cont_df) <- c("Gender", "VoteChoice", "SpendHouse", "Frequency") cont_df <-
cont_df %>%

group_by(Gender, VoteChoice) %>% mutate(
Percent = Frequency / sum(Frequency) * 100, Cumulative_Freq = cumsum(Frequency),
Cumulative_Percent = round(cumsum(Percent), 2)
)
cont_df <- cont_df %>% mutate(
Gender = factor(Gender, levels = c(1, 2), labels = c("Man", "Woman")),
VoteChoice = factor(VoteChoice, levels = c(1, 2, 3), labels = c("Liberal Party",
"Conservative Party", "NDP")),
SpendHouse = factor(SpendHouse, levels = c(1, 2, 3), labels = c("Less", "Same", "More"))
)
print(kable(cont_df, caption = "Cumulative Association Table with Categorical Associations
for Gender, Voting Choice, and Spending"))
```

Table 10. Party preference by gender

```
# Install haven necessary to read dataset install.packages("haven") #Load haven library
library("haven")
data <- X2021_Canadian_Election_Study_v2_0
write.csv(data, "C:\\Users\\arnol\\Desktop\\Writing\\2021 Canadian Election Study v2.0
(1).csv", row.names = FALSE)
data_csv <- read.csv("C:\\Users\\arnol\\Desktop\\Writing\\2021 Canadian Election Study
v2.0 (1).csv") install.packages("ggplot2")
library(ggplot2)
data$cps21_votechoice <- factor(data$cps21_votechoice) data$cps21_genderid <-
```

```
factor(data$cps21_genderid) library(ggplot2)
# Ensure that cps21_votechoice and cps21_genderid are treated as factors
data$cps21_votechoice <- as.factor(data$cps21_votechoice) data$cps21_genderid <-
as.factor(data$cps21_genderid) # Filter for only parties 1, 2, and 3
my_data_filtered <- data[data$cps21_votechoice %in% c("1", "2", "3"), ] # Filter for only
Men and Women

my_data_filtered <- my_data_filtered[my_data_filtered$cps21_genderid %in% c("1", "2"), ]


# Define labels for party and gender
party_labels <- c("1" = "Liberal", "2" = "Conservative", "3" = "NDP") gender_labels <- c("1"
= "Men", "2" = "Women")
# Define custom colors
custom_colors <- c("1" = "#ADD8E6", "2" = "#F08080") # Light Blue for Men, Light Coral
for Women # Grouped Bar Chart (Side-by-Side, with parties on the x-axis)
ggplot(my_data_filtered, aes(x = cps21_votechoice, fill = cps21_genderid)) +
geom_bar(position = "dodge") + # "dodge" for side-by-side
labs(x = "Party Preference", y = "Count", title = "Party Preference by Gender (Men and
Women only)") + scale_fill_manual(values = custom_colors, name = "Gender", labels =
gender_labels) + # Changed here scale_x_discrete(labels = party_labels) +
theme_bw()
```

Table 11: Distribution of voters' preference towards spending on education by gender

```
library(ggplot2) library(dplyr)
library(haven) # Make sure you have this installed too data <-
X2021_Canadian_Election_Study_v2_0 # Ensuring cps21_votechoice and cps21_genderid
are treated as factors data$cps21_votechoice <-
as.factor(data$cps21_votechoice) data$cps21_genderid <- as.factor(data$cps21_genderid)


# Convert haven labelled to factor and then numeric if needed
data$cps21_spend_educ <- as_factor(data$cps21_spend_educ) # Convert labelled to factors #
if you need the underlying numeric representation
# my_data$cps21_spend_educ <- as.numeric(my_data$cps21_spend_educ)
# Filter for only parties 1, 2, and 3 data_filtered <- data %>% filter(cps21_votechoice %in%
c("1", "2", "3"))
# Filter for only Men and Women data_filtered <- data_filtered %>% filter(cps21_genderid
%in% c("1", "2")) # Define labels for party and gender
party_labels <- c("1" = "Liberal", "2" = "Conservative", "3" = "NDP") gender_labels <- c("1"
= "Men", "2" = "Women")
# Histogram with faceting
ggplot(data_filtered, aes(x = cps21_spend_educ, fill = cps21_genderid)) + geom_bar(position
= "dodge") + # Changed to geom_bar to display categories

facet_wrap(~ factor(cps21_votechoice, levels = c("1", "2", "3"), labels = party_labels), ncol =
1) + #
Use party_labels here
labs(x = "Spending on Education", y = "Count",
title = "Distribution of Spending on Education by Gender and Party Preference") +
```

```
scale_fill_manual(values = c("1" = "#1b909a", "2" = "#7900f1"), # Custom colors
name = "Gender", labels = gender_labels) + theme_bw() +
guides(fill = guide_legend(title = "Gender")) # Adding gender label to the legend
```

Table 12. : Distribution of voters' preference towards spending on affordable housing by gender

```
library(ggplot2) library(dplyr)
library(haven) # Make sure you have this installed too


data <- X2021_Canadian_Election_Study_v2_0
# Ensuring cps21_votechoice and cps21_genderid are treated as factors
data$cps21_votechoice <- as.factor(data$cps21_votechoice) data$cps21_genderid <-
as.factor(data$cps21_genderid) data$cps21_spend_afford_h <-
as.factor(data$cps21_spend_afford_h)
# Filter for only parties 1, 2, and 3 data_filtered <- data %>% filter(cps21_votechoice %in%
c("1", "2", "3"))


# Filter for only Men and Women data_filtered <- data_filtered %>% filter(cps21_genderid
%in% c("1", "2"))
# Define labels for party and gender
party_labels <- c("1" = "Liberal", "2" = "Conservative", "3" = "NDP") gender_labels <- c("1"
= "Men", "2" = "Women")
# Histogram with faceting
ggplot(data_filtered, aes(x = factor(cps21_spend_afford_h, levels = c("1", "2", "3", "4"),
labels = housing_labels), fill = cps21_genderid)) +
geom_bar(position = "dodge") + # Changed to geom_bar to display categories
facet_wrap(~ factor(cps21_votechoice, levels = c("1", "2", "3"), labels = party_labels), ncol =
1) + #
Use party_labels here
labs(x = "Spending on Affordable Housing", y = "Count",
title = "Distribution of Spending on Affordable Housing by Gender and Party Preference") +
scale_fill_manual(values = c("1" = "#8724f5", "2" = "#F0ad2f"), # Custom colors
name = "Gender", labels = gender_labels) + theme_bw() +

guides(fill = guide_legend(title = "Gender")) # Adding gender label to the legend
```

Table 13: Regression with stargazer - excluding gender as controlling variable

```
>       mymodel1=lm(cps21_votechoice ~ cps21_genderid2 + cps21_spend_educ +
cps21_spend_afford_h, data=mydata1_filtered)
>       summary(mymodel1)


>mymodel2=lm(cps21_votechoice ~ cps21_genderid2 + cps21_spend_educ +
pes21_rural_urban + cps21_spend_afford_h + cps21_employment + cps21_education,
data=mydata1_filtered)
>       summary(mymodel2)
```

```
>mymodel3=lm(cps21_votechoice ~ cps21_genderid2 + cps21_spend_educ +
pes21_rural_urban + cps21_employment + cps21_education, data=mydata1_filtered)
>       summary(mymodel3)


>mymodel4=lm(cps21_votechoice ~ cps21_spend_educ + cps21_spend_afford_h,
data=mydata1_filtered)
>       summary(mymodel4)


>mymodel5=lm(cps21_votechoice ~ cps21_spend_educ + pes21_rural_urban +
cps21_spend_afford_h + cps21_employment, data=mydata1_filtered)
>       summary(mymodel5) install.packages("stargazer") library(stargazer)
stargazer(mymodel1, mymodel2, mymodel3, mymodel4, mymodel5, type="text")
```

Table 14. Stargazer on interaction (1) and Base (2) models

```
1.      mydata$female <- ifelse(mydata$female == "Female", 1, 0)


mydata$spend_gender_interaction <- mydata$cps21_spend_educ * mydata$female

mymodel_interaction <- lm(cps21_votechoice ~ cps21_spend_educ + female +
spend_gender_interaction +
cps21_spend_afford_h + cps21_education + cps21_employment + pes21_rural_urban +
cps21_bornin_canada,
data = mydata)


summary(mymodel_interaction)


2.      base_model <- lm(cps21_votechoice ~ cps21_spend_educ + female +
cps21_spend_afford_h
+ cps21_education + cps21_employment + pes21_rural_urban + cps21_bornin_canada, data
= mydata) summary(base_model) library(stargazer)
3.      stargazer(mymodel_interaction, base_model, type="text")
```

Test statistics: Tables 15-22

```
sigma(mydata1) summary(mydata1)$r.squared residuals( mydata1)

plot(fitted(mydata1), residuals(mydata1)) qqnorm(residuals(mydata1))
qqline(residuals(mydata1)) plot(density(res)) plot(density(residuals(mydata1))) plot(mydata1,
which = 1)
library(lmtest) bptest(mydata1)
```

qqnorm(residuals(mydata2)) qqline(residuals(mydata2)) plot(density(res))

plot(density(residuals(mydata2)))

plot(mydata2, which = 1)

library(lmtest) bptest(mydata2)

Table 23: Multilevel (hierarchical) logistic regression model
mydataa <- lmer(cps21_votechoice ~ female + cps21_spend_educ + (1 | cps21_province), data = mydata)
mydatab <- lmer(cps21_votechoice ~ female + cps21_spend_educ + (1 + female | cps21_province), data = mydata)
tab_model(mydataa, mydatab)

Graph 1:
plot_model(mydataa)

Table 24. Stargazer including the linear mixed models 1 and 2:
stargazer(mydataa, mydatab, type="text")

Table 25. Multinominal regression model:
mydata$cps21_spend_educC <- relevel(as.factor(mydata$cps21_spend_educC), ref = "Spend about the same as now")
mydata60<- multinom(cps21_spend_educC ~ gender_factor2, data = mydata)
summary(mydata60)
install.packages("sjPlot") library(sjPlot) tab_model(mydata60)