Assignment 3: Collaborating in Github

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Introduction

This report generates and displays summary statistics of text message counts by **Group** and **Time Point**. We calculate measures of central tendency and variability to understand texting patterns across two groups and over time.

Load Required Libraries

```r
library(readr)          # Reading CSV files
library(gt)             # Generating clean, styled summary tables
library(ggplot2)        # For plotting
library(dplyr)          # For data manipulation
library(tidyr)          # For reshaping data
library(wesanderson)    # For Wes Anderson-inspired color palettes
library(reshape)        # For converting data to long with melt()
```

Data Loading and Cleaning

```r
# set working directory as folder on desktop
# setwd("C:/Users/brand/OneDrive/Desktop/BHDS2010/ASSIGN3/bhds-assign-3")
# setwd("/Users/vleary71/Desktop/BHDS2010/ASSIGN3/bhds-assign-3")
# successfully set working directory

# Read in the dataset and clean header rows
data <- read.csv("TextMessages.csv")  # Reads the dataset into an R dataframe

# Reshape from wide to long format
data_long <- data %>%
  mutate(across(c(Baseline, Six_months), as.numeric),
         Group = as.factor(Group)) %>%
  pivot_longer(cols = c(Baseline, Six_months),
               names_to = "Time",
               values_to = "TextMessages")
```

Summary Statistics Calculation

We calculate:

- **Count** of observations per group/time
- **Mean**, **Median**, and **Standard Deviation** of text message counts

```
summary_table <- data_long %>%
  group_by(Group, Time) %>%
  summarise(
    Count = n(),
    Mean = round(mean(TextMessages, na.rm = TRUE), 2),
    Median = round(median(TextMessages, na.rm = TRUE), 2),
    SD = round(sd(TextMessages, na.rm = TRUE), 2),
    .groups = "drop"
  )
```

Summary Table Output

```
summary_table %>%
  gt() %>%
  tab_header(
    title = "Summary Statistics of Text Messages",
    subtitle = "Grouped by Treatment Group and Time Point"
  ) %>%
  cols_label(
    Group = "Group",
    Time = "Time Point",
    Count = "N",
    Mean = "Mean",
    Median = "Median",
    SD = "Standard Deviation"
  ) %>%
  fmt_number(columns = c(Mean, Median, SD), decimals = 2) %>%
  tab_options(
    table.font.size = 12,
    heading.title.font.size = 16,
    heading.subtitle.font.size = 14
  )
```

Summary Statistics of Text Messages
Grouped by Treatment Group and Time Point

Group	Time Point	N	Mean	Median	Standard Deviation
1	Baseline	25	64.84	64.00	10.68
1	Six_months	25	52.96	58.00	16.33
2	Baseline	25	65.60	65.00	10.84
2	Six_months	25	61.84	62.00	9.41

Inference

- If the **mean** and **median** differ substantially, this may suggest skewness in message volume.
- Compare between **Groups** to explore differences in texting behavior.
- An increase from **Baseline** to **Six_months** may indicate behavioral changes over time.
- Use standard deviation to understand variability within each subgroup.

```
###Visualization 1:
#Stratified boxplot of text messages by Group and Time
#Hint: Faceted Boxplot

#Read data set in
#Use read.csv since the file is a csv file
text_data <- read.csv("TextMessages.csv")
#File was successfully read in

#Use nrow() to check the number of rows/observations
nrow(text_data)
```

```
## [1] 50
```

```
#There are 50 rows in the dataset

#Use names() to view the variable names
names(text_data)
```

```
## [1] "Group"       "Baseline"    "Six_months"  "Participant"
```

```
#There are variables "Group", "Baseline", "Six_months" and "Participant"

#Using cbind to combine the melted text data without the Group variable with a
#a column containing the Group variable replicated a second time.
long_text_data <- cbind(melt(text_data[,-1],
                             id.vars = "Participant", #not melting Participant
                             variable_name = "Time", #Variable name for melted
                       value.names = "Texts"), #argument not working? Supposed
                       #to change the variable name to "Texts", but doesn't
                       #seem to work anymore.
                       Group = rep(text_data$Group, 2)) #Using rep() to replicate
```

```r
#Use is.factor() to check if Group is a factor
is.factor(long_text_data$Group)
```

```
## [1] FALSE
```

```r
#FALSE was returned
#Use as.factor() to change it to a factor
long_text_data$Group <- as.factor(long_text_data$Group)
#Verify again with is.factor()
is.factor(long_text_data$Group)
```

```
## [1] TRUE
```

```r
#TRUE is returned this time

#Check if Time is a factor with is.factor()
is.factor(long_text_data$Time)
```

```
## [1] TRUE
```

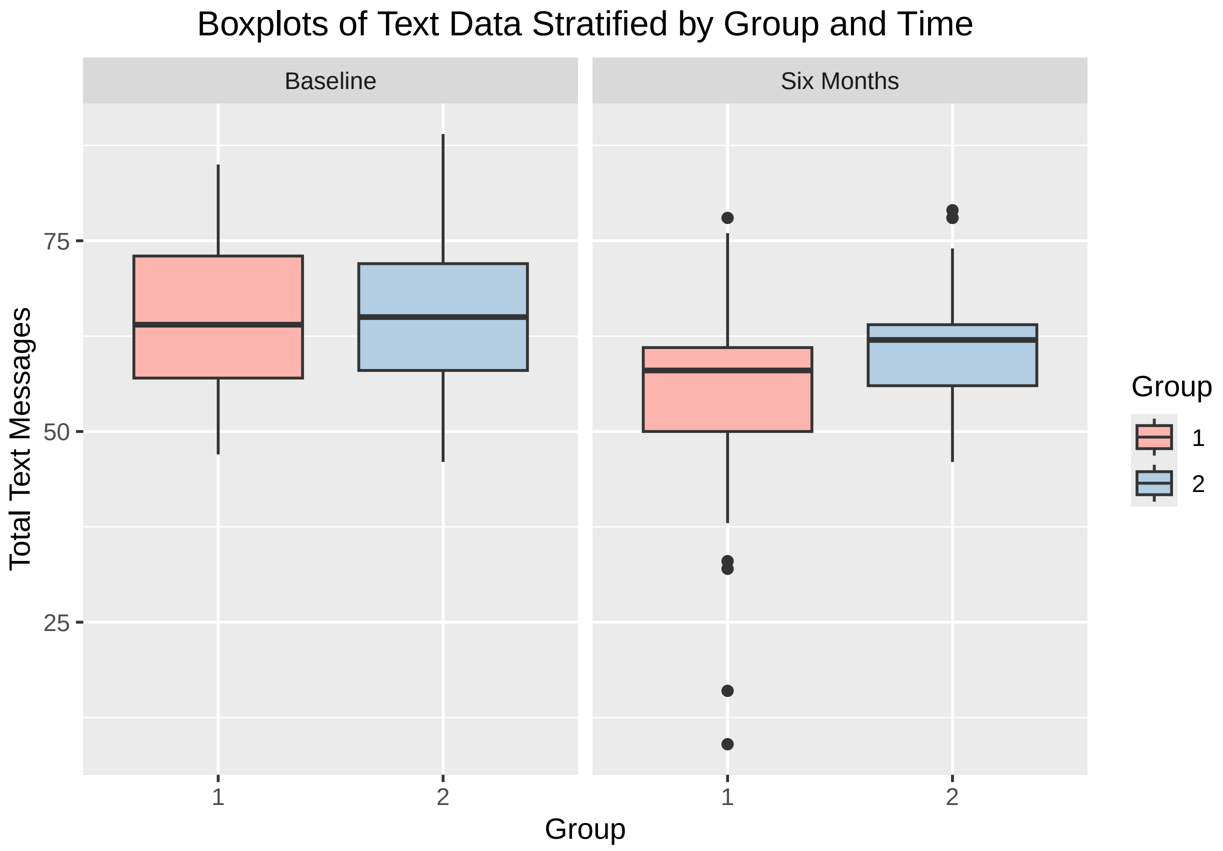
```r
#TRUE was returned

#Check the factor names of Time using levels()
levels(long_text_data$Time)
```

```
## [1] "Baseline"   "Six_months"
```

```r
#"Baseline" and "Six_months" were returned

#Use levels again and set the names of the factors to have "Six Months" for
#easier readability for the boxplots
levels(long_text_data$Time) <- c("Baseline", "Six Months")
#check the levels again
levels(long_text_data$Time)
```

```
## [1] "Baseline"   "Six Months"
```

```r
#Now "Baseline" and "Six Months" was returned


######Plot the boxplots

#Use ggplot() with aes set for group on x to stratify and value on y with
#fill = group to allow the plots to be colored
ggplot(long_text_data, aes(x=Group, y = value, fill = Group)) +
  #adding a boxplot with geom_boxplot()
  geom_boxplot() +
  #Use facet_wrap() to stratify the boxplots by time
  facet_wrap(.~Time) +
  #add labels for the title and y axis
  labs(title = "Boxplots of Text Data Stratified by Group and Time",
       y = "Total Text Messages")+
  #adding a color to the boxplots
  scale_fill_brewer(palette = "Pastel1") +
  #centering the title of the plot
  theme(plot.title = element_text(hjust = 0.5))
```

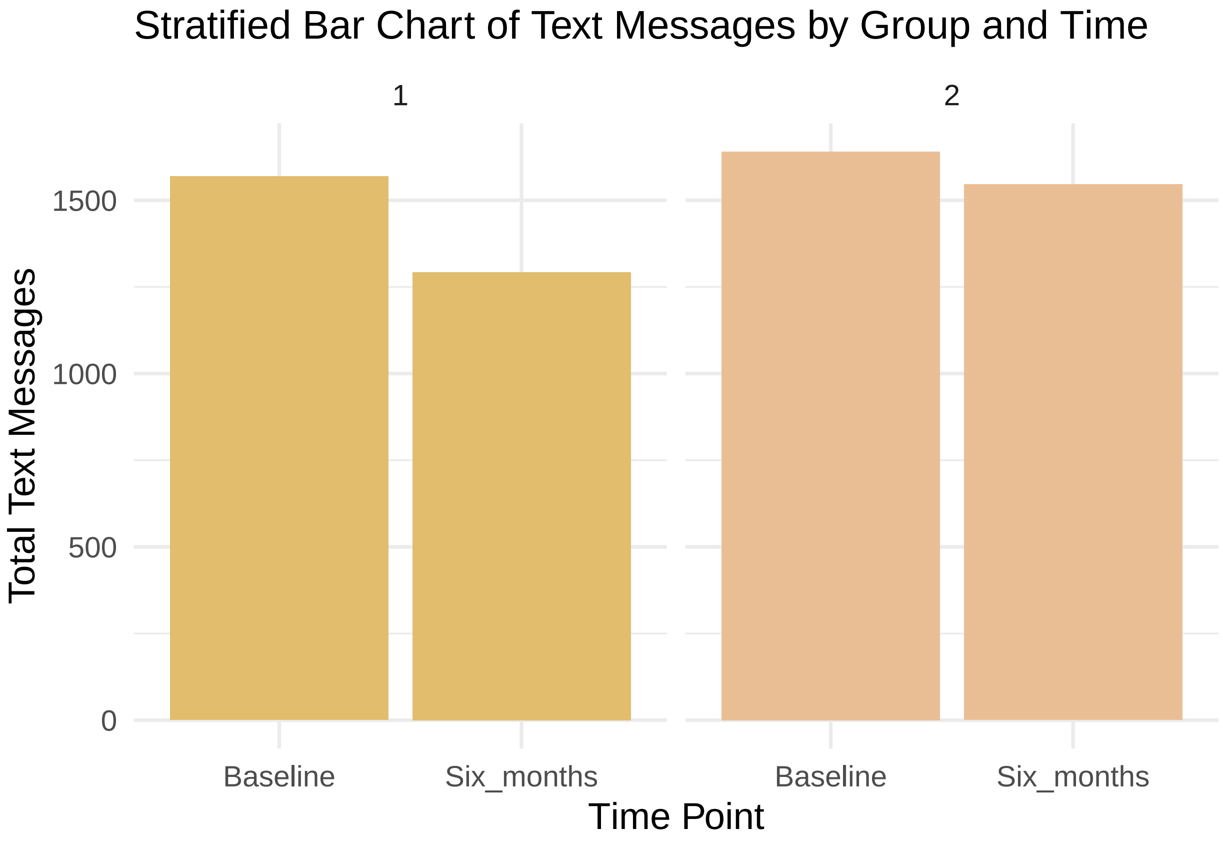


```
#The figure was successfully created
```

```
###Visualization 2:
# stratified_bar_chart.R
# Stratified Bar Chart of Text Messages by Group and Time
# Author: Collaborative GitHub Project Team/Veronica Leary
# Description: This script generates a stratified bar chart with a Wes Anderson
#color palette using ggplot2 and dplyr

# Load and clean the dataset
data <- read.csv("TextMessages.csv")  # Load dataset

# Rename columns for clarity
colnames(data) <- c("Group", "Baseline", "Six_months", "Participant")

# Remove redundant header row
data <- data[-1, ]
```

```r
# Convert data types and reshape
data <- data %>%
  mutate(across(c(Baseline, Six_months), as.numeric),
         Group = as.factor(Group)) %>%
  pivot_longer(cols = c(Baseline, Six_months),
               names_to = "Time",
               values_to = "TextMessages")
```

```r
#Use ggplot() with pipeline and dplyr set as groups 1 and 2 and stratified by
#two points in time-at basline and six months (x-axis) and assessed by the
#number of text messages (y-axis) with text messages ranging from 0 to 1500
data %>%
  group_by(Group, Time) %>%
  summarise(TotalMessages = sum(TextMessages, na.rm = TRUE), .groups = "drop") %>%
  ggplot(aes(x = Time, y = TotalMessages, fill = Group)) +
  geom_bar(stat = "identity", position = "dodge") +
  facet_wrap(~ Group) +
  scale_fill_manual(values = wes_palette("Rushmore", n = 2)) +
  labs(title = "Stratified Bar Chart of Text Messages by Group and Time",
       x = "Time Point",
       y = "Total Text Messages") +
  theme_minimal(base_size = 14) +
  theme(legend.position = "none",plot.title = element_text(size=15))
```



Project Summary

This script outlines the contributions and workflow from our group project analyzing text message data.

It can be used as a reference in combination with the visual and statistical output scripts.

Contributions Overview

Brandon Yee:

- Responsible for initial setup of Github repository

- Responsible for Visualization 1: Stratified boxplot using ggplot2 default theme.

- This visualization highlighted the distribution of text messages across time and group,

including medians, variability, and outliers.

- Responsible originally for summary statistics:

- Wrote code for summary statistics using stat.desc and by functions.

- Deferred and handed off to Veronica since she had a more aesthetic display method.

Veronica Leary:

- Responsible for Visualization 2: Stratified bar chart using ggplot2 + wesanderson theme.

- Allowed for comparison of total message counts between groups and time points.

- Revealed possible increase in message volume in Group B over time.

- Responsible for Summary Statistics:

```
# GitHub Workflow
```

GitHub Workflow

- Created a dedicated branch for visualizations and documentation tasks.

- Commit messages included:

- “Added stratified bar chart with Wes Anderson color palette”

- “Generated summary statistics table with gt”

- “Created documentation and embedded inference blocks”

- Pushes were successful, but merge is pending due to repository permissions

(partner is the owner of the GitHub repo).

- Push and merge to main branch by Brandon was successful after he reviewed and edited.

Reflection

This assignment helped reinforce:

- The value of clear commit messages and reproducible code.

- Collaborative coding practices using Git and GitHub.

- Communicating visual and statistical insights clearly through embedded narrative.