Data 211 Final Project

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#Libraries

```
library(ggplot2)
library(readxl)

## Warning: package 'readxl' was built under R version 4.5.2

library(tidyverse)

## Warning: package 'tidyverse' was built under R version 4.5.2

## Warning: package 'tidyr' was built under R version 4.5.2

## Warning: package 'readr' was built under R version 4.5.2

## Warning: package 'purrr' was built under R version 4.5.2

## Warning: package 'forcats' was built under R version 4.5.2

## Warning: package 'lubridate' was built under R version 4.5.2

## ── Attaching core tidyverse packages ──────────────────────── tidyverse
2.0.0 ──
## ✓ dplyr     1.1.4     ✓ readr     2.1.5
## ✓ forcats   1.0.1     ✓ stringr   1.5.2
## ✓ lubridate 1.9.4     ✓ tibble    3.3.0
## ✓ purrr     1.1.0     ✓ tidyr     1.3.1
## ── Conflicts ────────────────────────────────────────
tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all
conflicts to become errors
```

#Load data into a new dataset

```
Calories<-read_excel("C:/Users/Patrick/Desktop/Prog/R/Data 211 Final Project
Data Collection .xlsx")
```

#Change format for graph and table

```
NewCalories<-Calories%>%
  mutate(`Day of Data`=c(1:14))
```

Initial Statistical Summary

```
summary(Calories)
```

```
##   Day of Data                   Total Calories Ultra-Processed  Unprocessed
##  Min.   :2025-11-02 00:00:00   Min.   :1935   Min.   : 774    Min.   : 790
##  1st Qu.:2025-11-05 06:00:00   1st Qu.:2116   1st Qu.: 920    1st Qu.:1012
##  Median :2025-11-08 12:00:00   Median :2216   Median :1068    Median :1194
##  Mean   :2025-11-08 12:00:00   Mean   :2242   Mean   :1063    Mean   :1179
##  3rd Qu.:2025-11-11 18:00:00   3rd Qu.:2392   3rd Qu.:1214    3rd Qu.:1259
##  Max.   :2025-11-15 00:00:00   Max.   :2580   Max.   :1315    Max.   :1610
##  Percent of Ultra-Processed Calories
##  Min.   :36.00
##  1st Qu.:40.50
##  Median :47.00
##  Mean   :47.64
##  3rd Qu.:53.75
##  Max.   :60.00
```

```
sd(Calories$`Percent of Ultra-Processed Calories`)
```

```
## [1] 7.830975
```

```
range(Calories$`Percent of Ultra-Processed Calories`)
```

```
## [1] 36 60
```

Table

```
PercentTable<-NewCalories%>%
  select(`Day of Data`,`Percent of Ultra-Processed Calories`)

PercentTable
```

```
## # A tibble: 14 × 2
##    `Day of Data` `Percent of Ultra-Processed Calories`
##            <int>                                 <dbl>
##  1             1                                    40
##  2             2                                    58
##  3             3                                    51
##  4             4                                    45
##  5             5                                    60
##  6             6                                    56
##  7             7                                    48
##  8             8                                    54
##  9             9                                    42
## 10            10                                    46
## 11            11                                    53
## 12            12                                    38
```

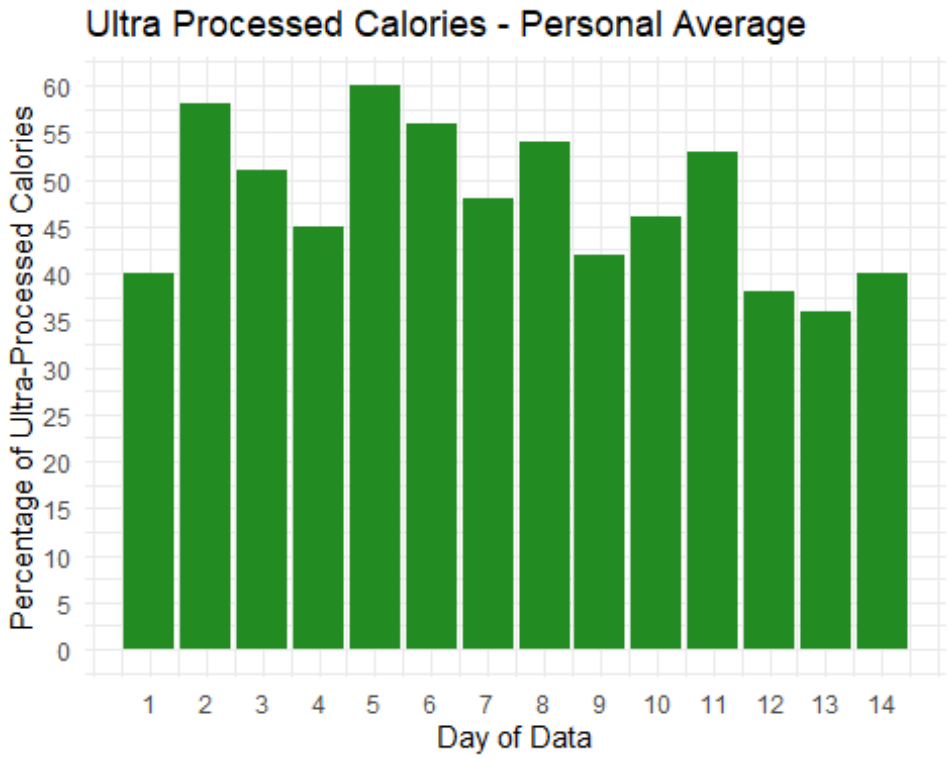
```
## 13            13                                    36
## 14            14                                    40

NewCalories

## # A tibble: 14 × 5
##    `Day of Data` `Total Calories` `Ultra-Processed` Unprocessed
##            <int>            <dbl>             <dbl>       <dbl>
##  1             1             2467               987        1480
##  2             2             2113              1225         888
##  3             3             2580              1315        1265
##  4             4             2248              1011        1237
##  5             5             1976              1186         790
##  6             6             2185              1224         961
##  7             7             2360              1133        1227
##  8             8             2291              1237        1054
##  9             9             2140               899        1241
## 10            10             2045               941        1104
## 11            11             2123              1125         998
## 12            12             2402               913        1489
## 13            13             2516               906        1610
## 14            14             1935               774        1161
## # ℹ 1 more variable: `Percent of Ultra-Processed Calories` <dbl>
```

Visualizations

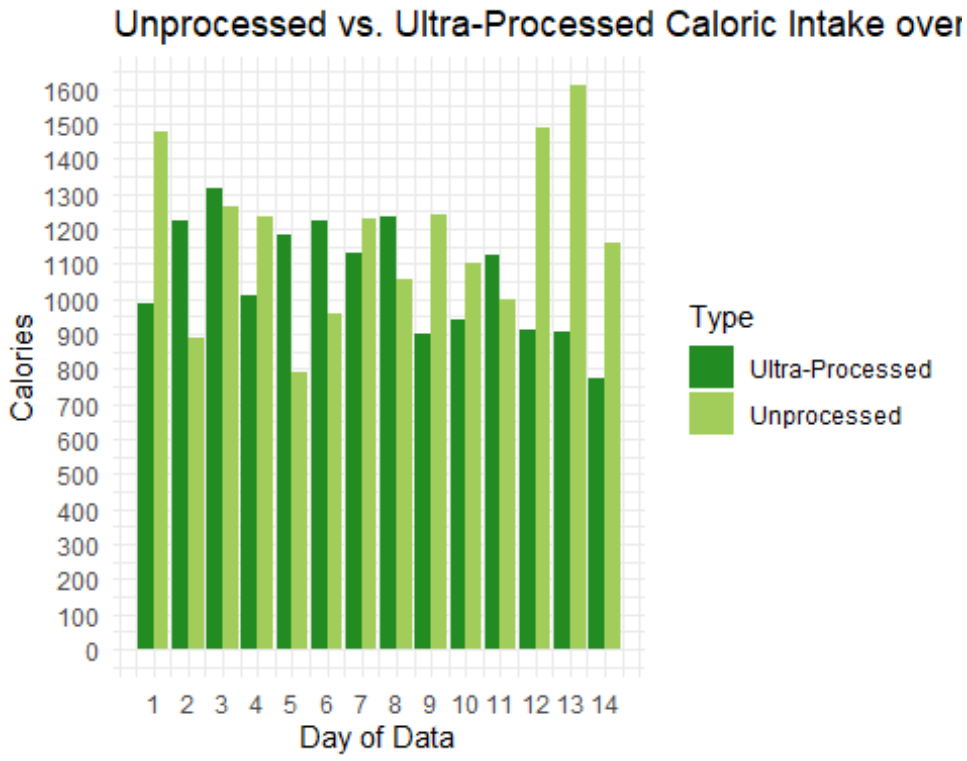
```
ggplot(data=NewCalories,aes(x=`Day of Data`,y=`Percent of Ultra-Processed
Calories`))+
  geom_bar(stat="identity",fill="forestgreen")+
  scale_x_continuous(breaks=c(1:14))+
  scale_y_continuous(breaks=seq(0,60,by=5))+
  labs(title="Ultra Processed Calories - Personal Average",
       x="Day of Data",
       y="Percentage of Ultra-Processed Calories")+
  theme_minimal()
```



#Formatting to long data for caloric comparison.

```
LongCalories<-pivot_longer(NewCalories,cols =c("Unprocessed","Ultra-
Processed"),names_to = "Type",values_to = "Calories")

ggplot(data=LongCalories,aes(x=`Day of Data`,y=Calories,fill=Type))+
  geom_bar(stat="identity",position="dodge")+
  labs(title="Unprocessed vs. Ultra-Processed Caloric Intake over 14 days")+
  scale_x_continuous(breaks=c(1:14))+
  scale_y_continuous(breaks=seq(0,1700,by=100))+
  theme_minimal()+
  scale_fill_manual(values=c("forestgreen","darkolivegreen3"))
```



Statistical Analysis

p_m:mean percentage of my ultra-processed calories.

$H_0: p_m = 55$ vs. $H_1: p_m < 55$

```
t_test_result<-t.test(NewCalories$`Percent of Ultra-Processed
Calories`,mu=55,alternative="less")
print(t_test_result)
```

```
##
##  One Sample t-test
##
## data:  NewCalories$`Percent of Ultra-Processed Calories`
## t = -3.5153, df = 13, p-value = 0.001901
## alternative hypothesis: true mean is less than 55
## 95 percent confidence interval:
##      -Inf 51.34927
## sample estimates:
## mean of x
##  47.64286
```

$p - value \approx 0.0019 < \alpha = 0.05$. Reject H_0. So at 5% significance level, we have enough evidence to conclude that the percentage of my ultra-processed calories is less than the American average of 55%.