Homework 3

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Loading Libraries & Reading in Data

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.2     v tibble    3.2.1
## v lubridate 1.9.4     v tidyr     1.3.1
## v purrr     1.1.0
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(colorfindr)
library(dplyr)
library(ggplot2)
df <- read.csv("homework3_data.csv")
head(df)
```

```
##      sales design items nps
## 1 32.55146      0     2   4
## 2 35.38214      0     4   5
## 3 30.87418      0     3   4
## 4 35.54265      0     3   6
## 5 32.07379      0     2   6
## 6 31.55580      0     1   4
```

Summary Statistics of the Company Data

```
summary(df$sales)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   25.83   30.86   33.76   33.66   35.57   44.30
```

```
table(df$design)
```

```
##
##   0   1
## 101  99
```

Distinct Color Selection (e-commerce Company of Choice: Etsy)

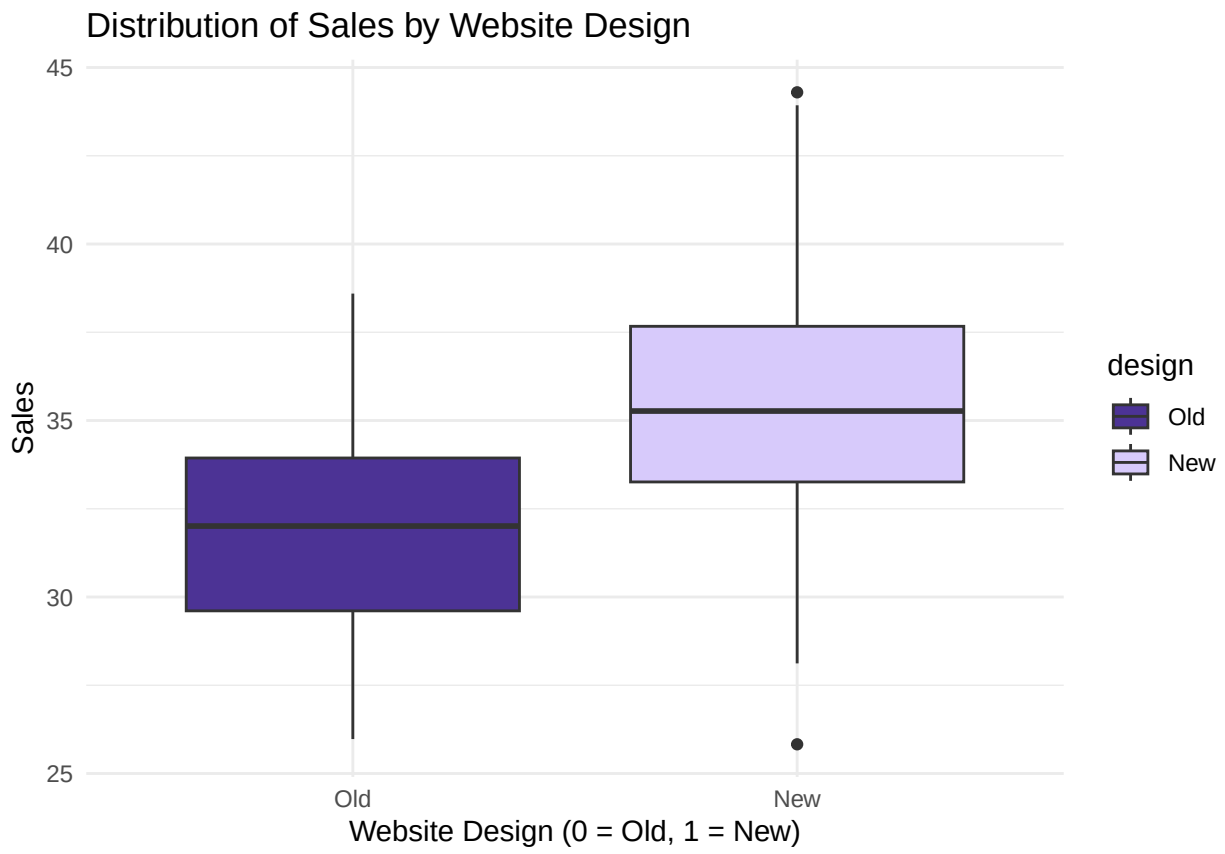
```
colors_data <- get_colors("~/Desktop/etsyimage.png")
print(colors_data)
```

```
## # A tibble: 105,697 x 3
##    col_hex col_freq col_share
##    <chr>      <int>     <dbl>
##  1 #FFFFFF   723905   0.430
##  2 #4C3395   339843   0.202
##  3 #D7CAFB    80684   0.0479
##  4 #FFFEFF    30103   0.0179
##  5 #4C3394    10028   0.00596
##  6 #FEFEFE     9648   0.00573
##  7 #FFFFFD     6157   0.00366
##  8 #FEFDFF     5628   0.00334
##  9 #4D3395     5062   0.00301
## 10 #FEFBFF     4751   0.00282
## # i 105,687 more rows
```

```
#Etsy company website color selection
custom_colors <- c("#4C3395", "#D7CAFB")
```

Graphical Evidence 1:

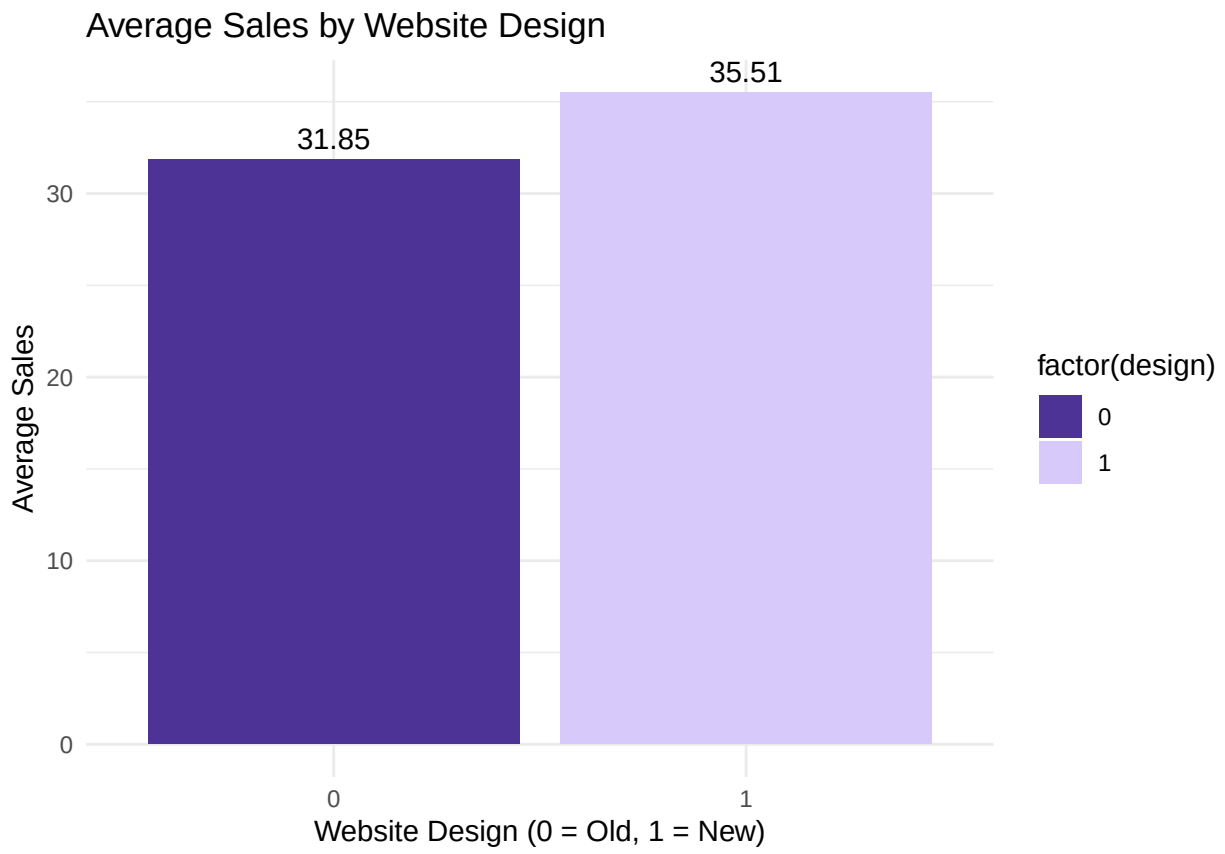
```
# Boxplot of sales by design
df %>%
  mutate(design= factor(design, labels = c("Old", "New"))) %>%
  ggplot(aes(x = design, y = sales, fill = design)) +
  geom_boxplot() +
  scale_fill_manual(values = custom_colors) +
  labs(x = "Website Design (0 = Old, 1 = New)", y = "Sales",
       title = "Distribution of Sales by Website Design") +
  theme_minimal()
```



Graphical Evidence 2:

```r
# Bar chart of average sales and NPS
summary_stats <- df %>%
  group_by(design) %>%
  summarise(
    avg_sales = mean(sales),
    avg_nps   = mean(nps),
    .groups = "drop"
  )

ggplot(summary_stats, aes(x = factor(design), y = avg_sales, fill = factor(design))) +
  geom_col(position = "dodge") +
  scale_fill_manual(values = custom_colors) +
  geom_text(aes(label = round(avg_sales, 2)), vjust = -0.5) +
  labs(x = "Website Design (0 = Old, 1 = New)", y = "Average Sales",
       title = "Average Sales by Website Design") +
  theme_minimal()
```



Estimated Sales Change from the group means:

```
sales_total_stats <- df %>%
  group_by(design) %>%
  summarize(mean_sales = mean(sales), groups = "drop")
sales_total_stats
```

```
## # A tibble: 2 x 3
##   design mean_sales groups
##    <int>      <dbl> <chr>
## 1      0       31.8 drop
## 2      1       35.5 drop
```

Average Increase in Sales:

```
avg_sales_increase <- sales_total_stats$mean_sales[2] - sales_total_stats$mean_sales[1]
avg_sales_increase
```

```
## [1] 3.664904
```

T-test Summary Stat:

```
t.test(sales ~ design, data=df)
```

```
##
##  Welch Two Sample t-test
##
## data:  sales by design
## t = -8.1554, df = 186.01, p-value = 5.042e-14
## alternative hypothesis: true difference in means between group 0 and group 1 is not equal to 0
## 95 percent confidence interval:
##  -4.551445 -2.778364
## sample estimates:
## mean in group 0 mean in group 1
##        31.84819        35.51309
```

Primary Recommendation:

Alternative Statement:

Based on the boxplot…

Based on the histogram…

From a statistical standpoint…

This very low p-value indicates…

While the evidence support redesign, it's important to consider the alternative explanations for the observed increase in sales: