Client Report (Placeholder)

Parham Pishrobat, Sarah Masri, Johnson Chen

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```r
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   3.4.4     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.0
## v purrr     1.0.2
## -- 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
```

```r
library(lubridate)
library(rlang)
```

```
##
## Attaching package: 'rlang'
##
## The following objects are masked from 'package:purrr':
##
##     %@%, flatten, flatten_chr, flatten_dbl, flatten_int, flatten_lgl,
##     flatten_raw, invoke, splice
```

```r
library(visdat)
source("../code/EDA.R")
source("../code/ITSA.R")
source("../code/GEE.R")
source("../code/LMEM.R")
```

Introduction

- Background of the study.
- Objective(s) of the study.
- Statistical questions to answer.

Concerns around sugar consumption and its health implications have prompted an array of interventions aimed at modifying consumer behaviours in relation to sugary beverages. The current study investigates the effectiveness of various strategies to encourage consumers to choose zero-calorie beverages over sugary alternatives. In particular, the research question focuses on the impact of two types of visual presentations of calorie content through posters that highlight either the calorie content or the physical activity required to burn these calories. Furthermore, the effectiveness of price discounts, both independently and in conjunction with explanatory messaging, as a means to influence consumer choices is explored.

Data Description and Summaries

- Data collection method.
- Study design.
- Sample size.
- Variables measured.
- Missing data.

The data has been collected data from cafeterias and convenience shops within three hospital sites, denoted by A, B, C, after conducting the interventions. Hospitals A is urban and has two cafeterias and two convenience shops. Hospital B is also urban setting and but has only one cafeteria. And finally hospital C is suburban setting, and has one cafeteria and one convenience shop. Both interventions (delivery of discount or the messaging type) and data collection (recording the sales) was automatic at site A and by trained personnel in sites B and C. In the context of this study, sugary beverages include regular soft drinks and iced teas that are sweetened with natural sugars like sucrose and corn syrup, and zero-calorie beverages include diet soft drinks and teas, and water. Note that other beverage types like juices, milk, coffee, and fountain-dispensed drinks are excluded due to categorization challenges.

The study adopts an interrupted time-series multi-site quasi-experimental design to assess the outcomes of five distinct interventions on the purchase patterns of bottled sugary and zero-calorie beverages. The interventions consist of two price discounts and three calorie messaging strategies, each designed to influence consumer purchasing behaviour towards healthier beverage options. The price interventions involved a 10% discount on zero-calorie beverages, with one intervention additionally providing explanatory messaging about the discount. The calorie messaging interventions varied in their approach, providing information on the caloric content of sugary beverages, the physical activity required to burn off these calories, and a combination of both strategies.

The primary outcome of interest is daily sales of bottled sugary and zero-calorie beverages over a span of 30 weeks, from October 27 to May 23. The study periods include baseline data collection phases, intervention phases for both price discounts and calorie messaging, and washout periods to assess the persistence of intervention effects.

(INCOMPLETE)

```
# summarize_data(beverage_sales)$numerical
# unique(beverage_sales$Site)
# unique(beverage_sales$Intervention)
```

3. Exploratory Analysis

NOTE: we will figure out the order and title of these sub sections at the end

histogram and scatter plots, boxplot (Par; almost done)

```
plot_histograms(beverage_sales)

## Warning: `aes_string()` was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with `aes()`.
## i See also `vignette("ggplot2-in-packages")` for more information.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```
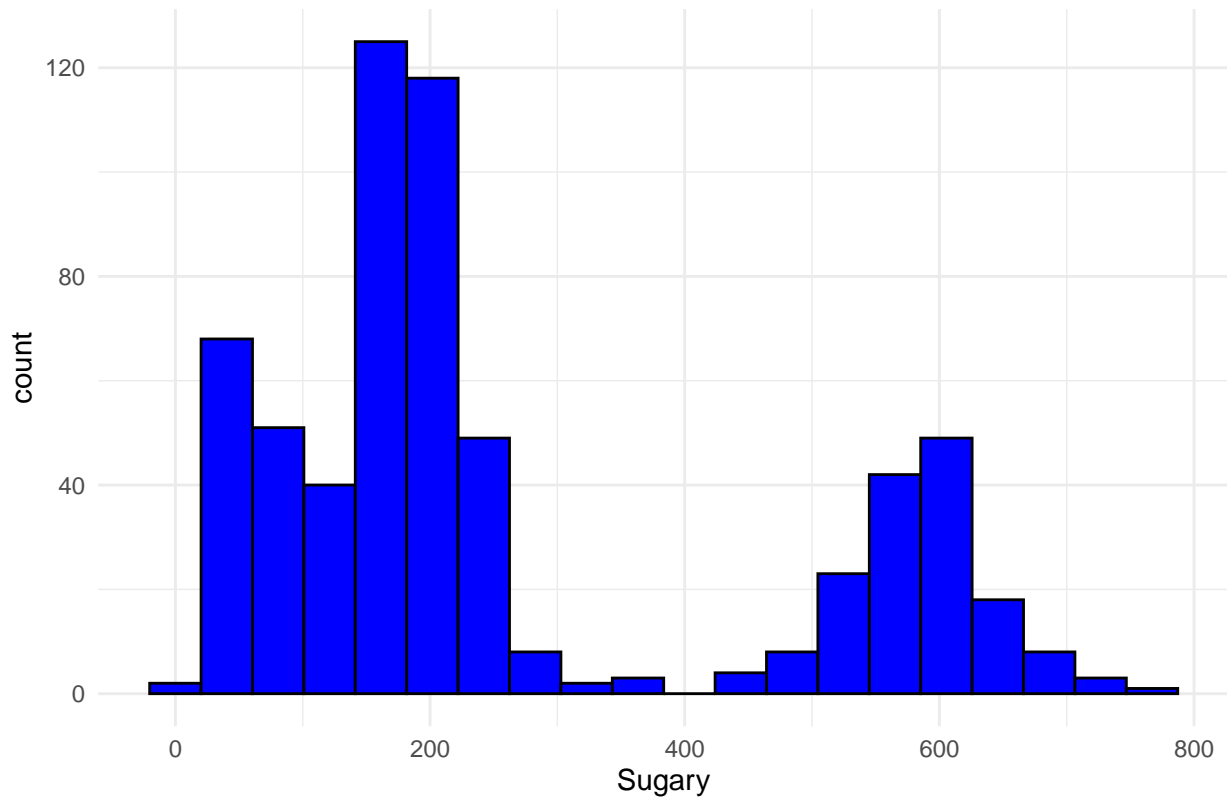
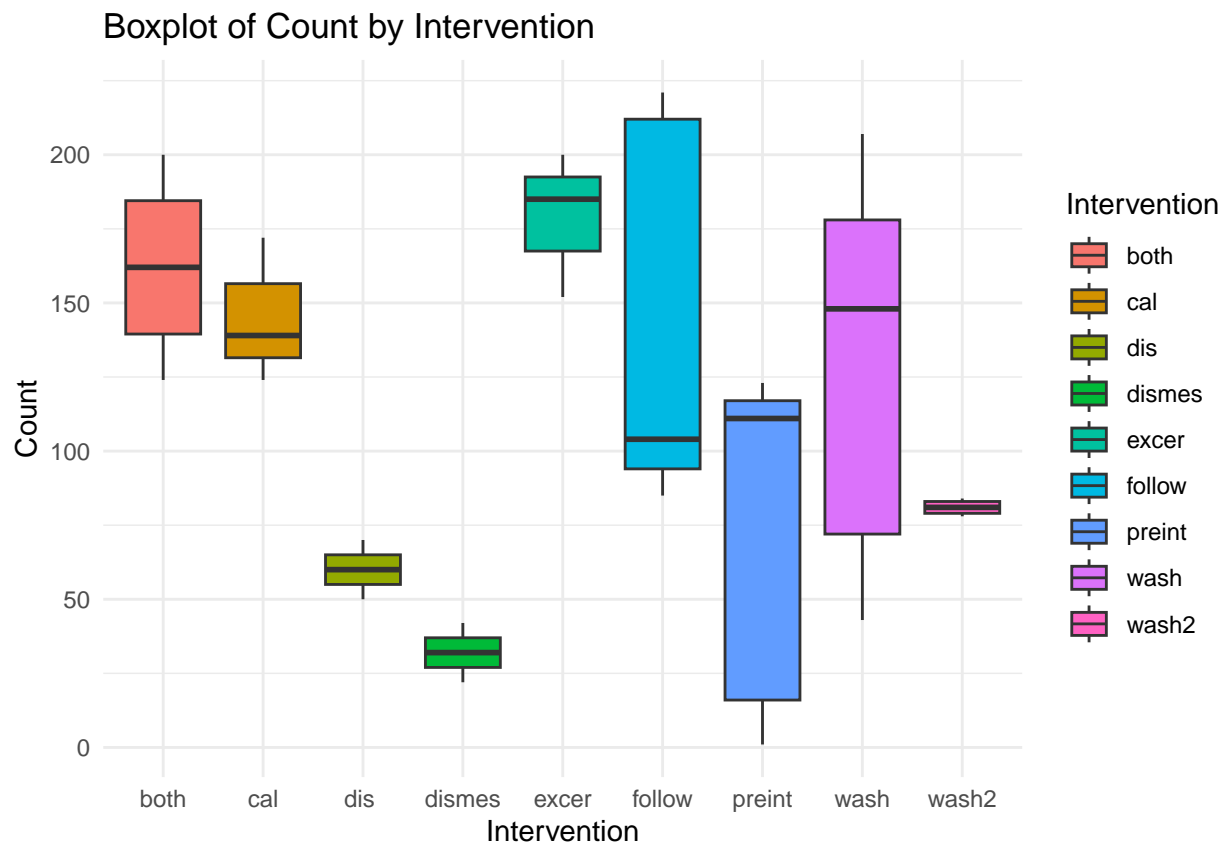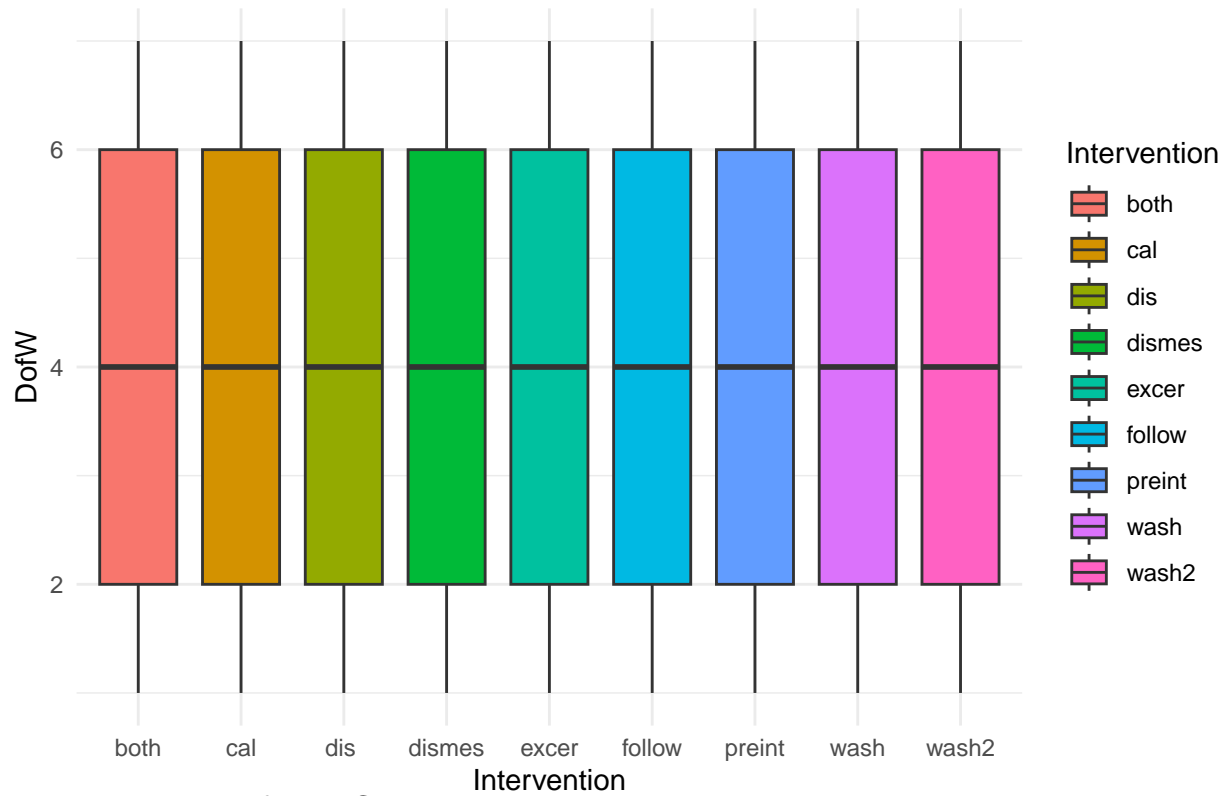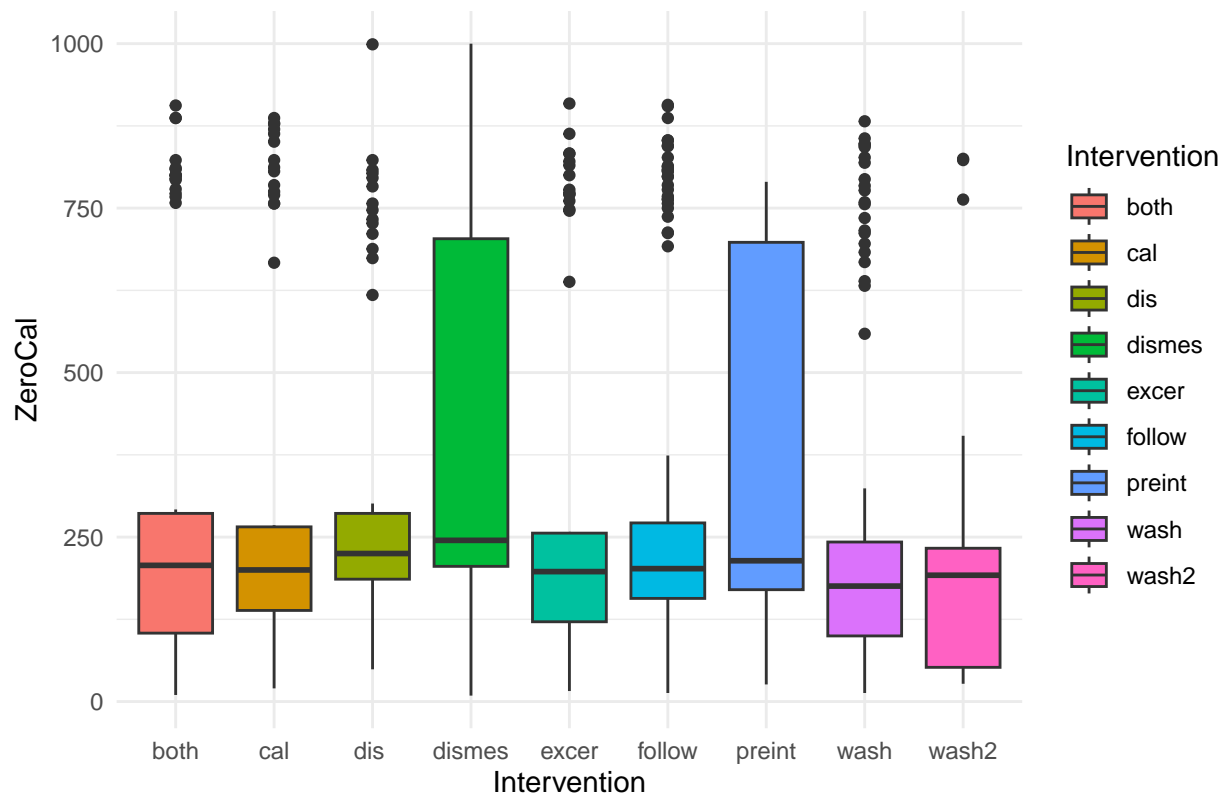## Distribution of Count

Distribution of DofW
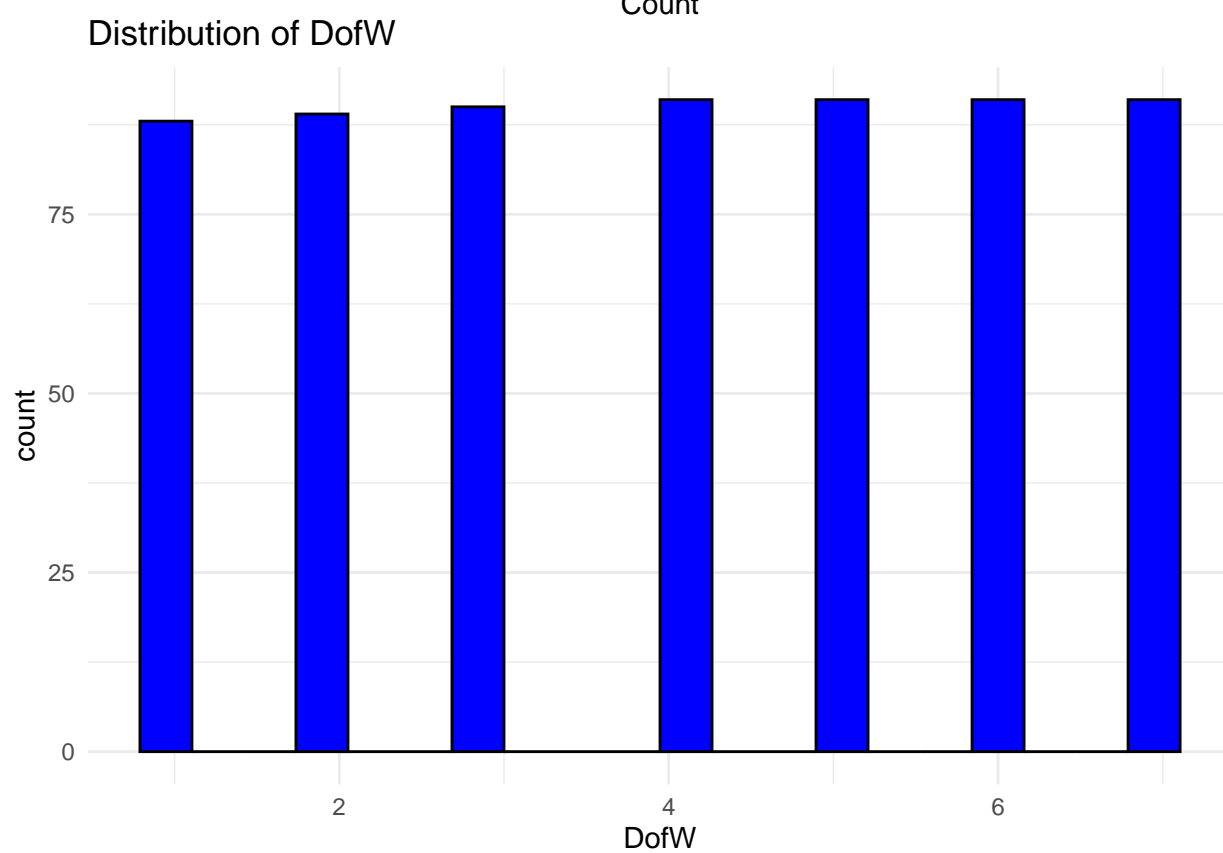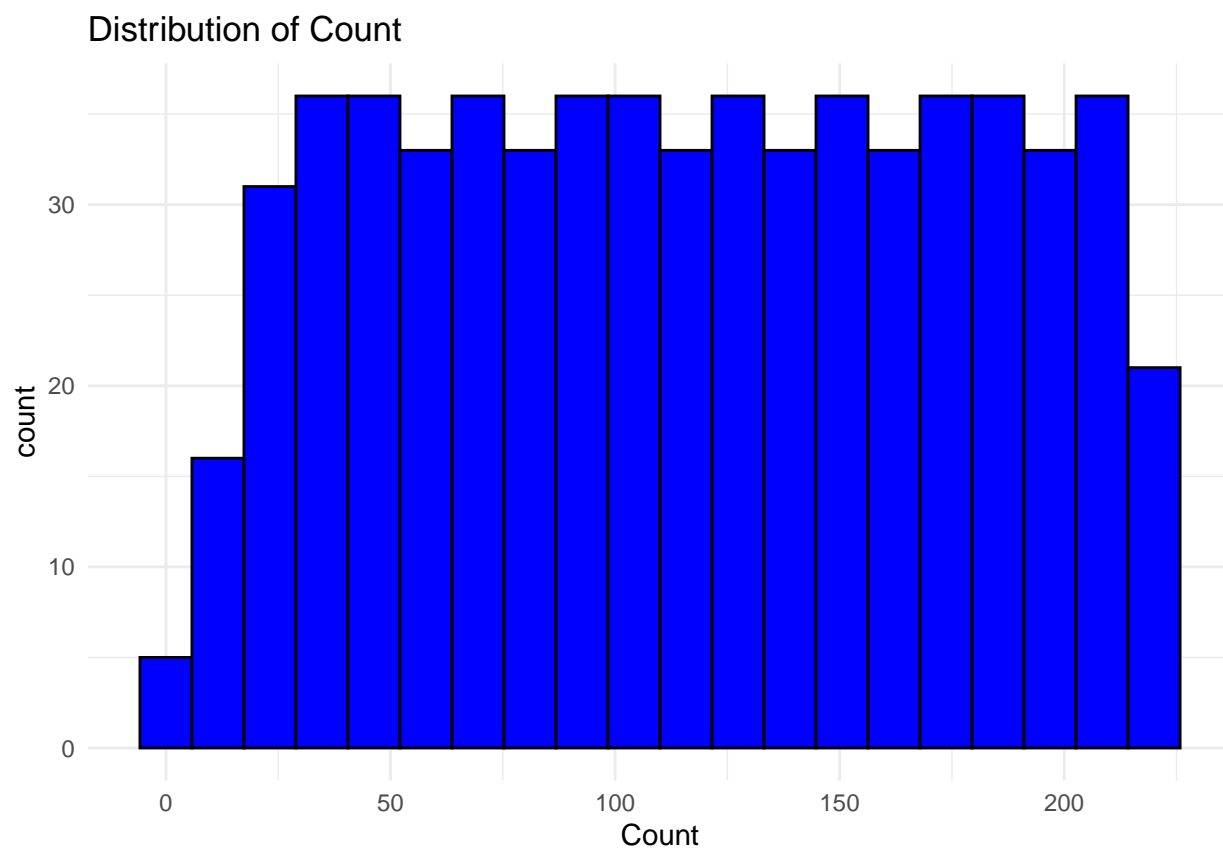
Distribution of ZeroCal
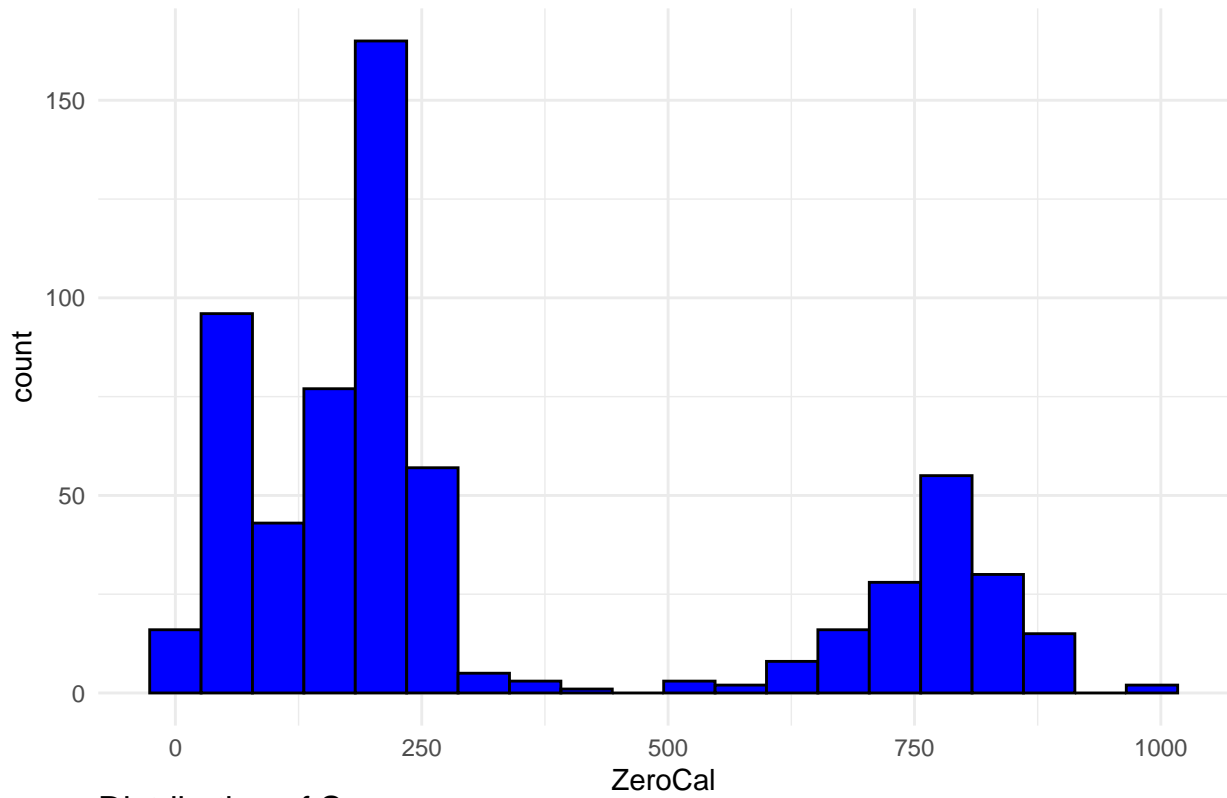
Distribution of Sugary

```
boxplots_by_category(beverage_sales, "Intervention")
```
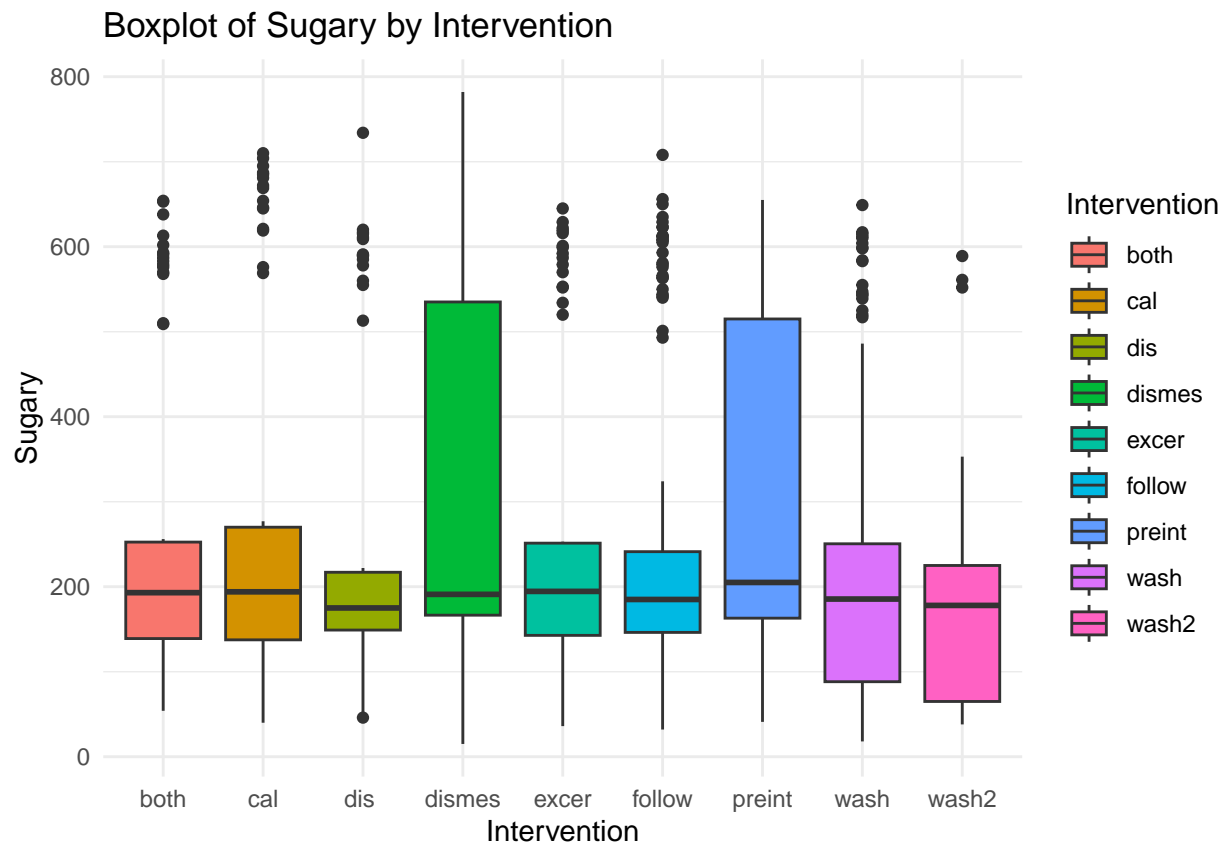
Boxplot of Count by Intervention

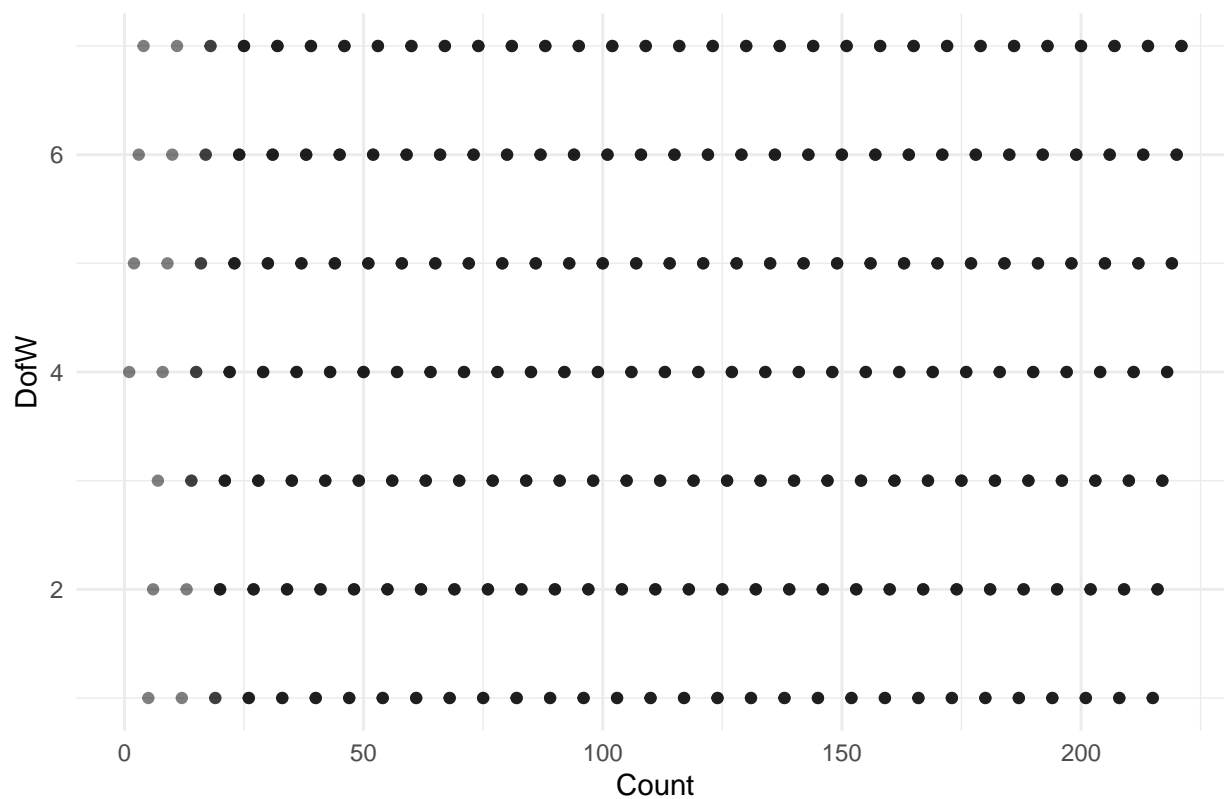# Boxplot of DofW by Intervention

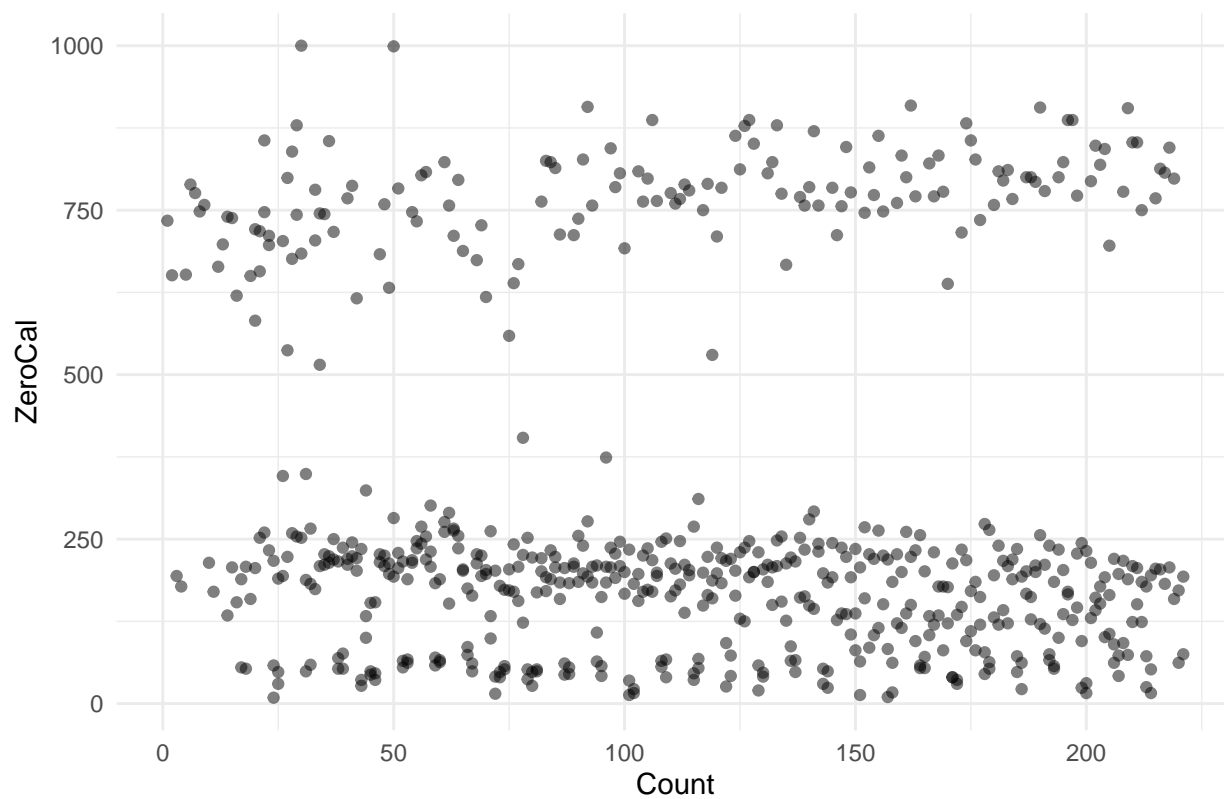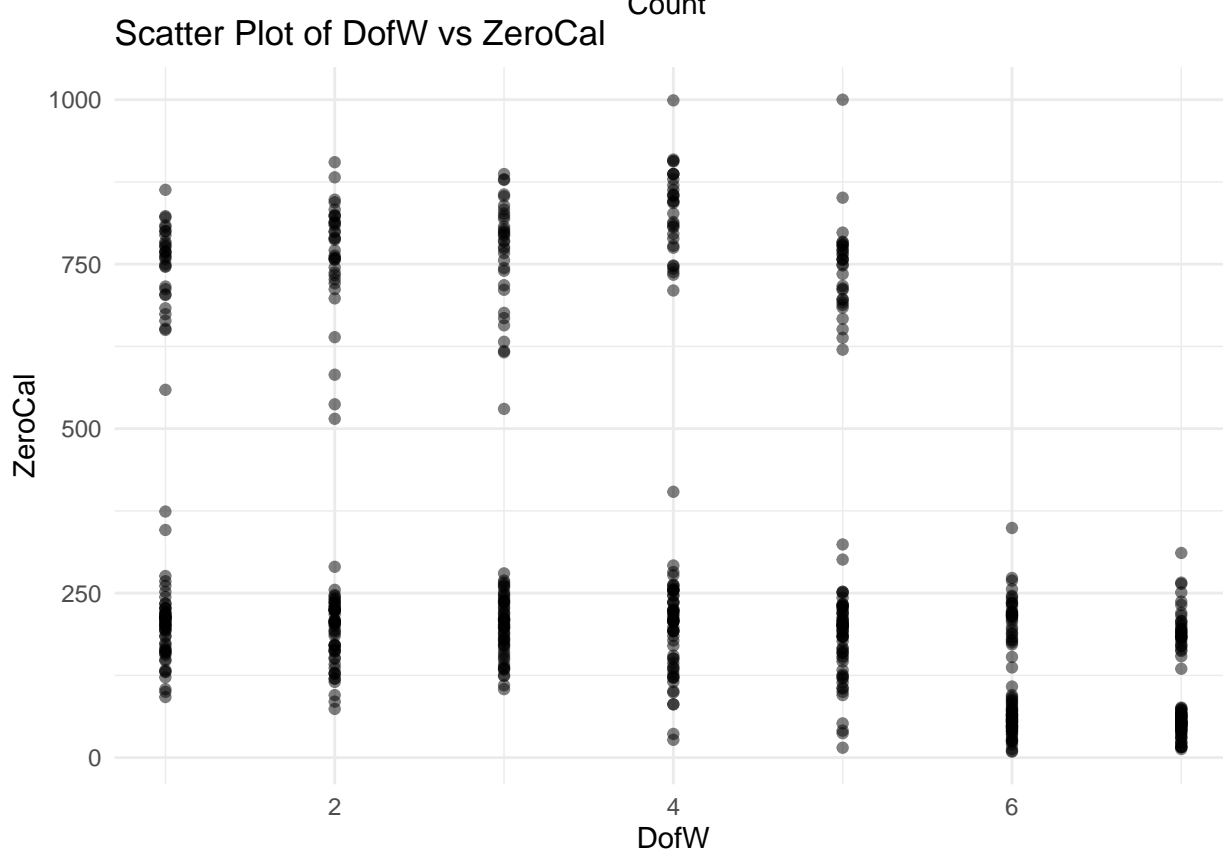# Boxplot of ZeroCal by Intervention

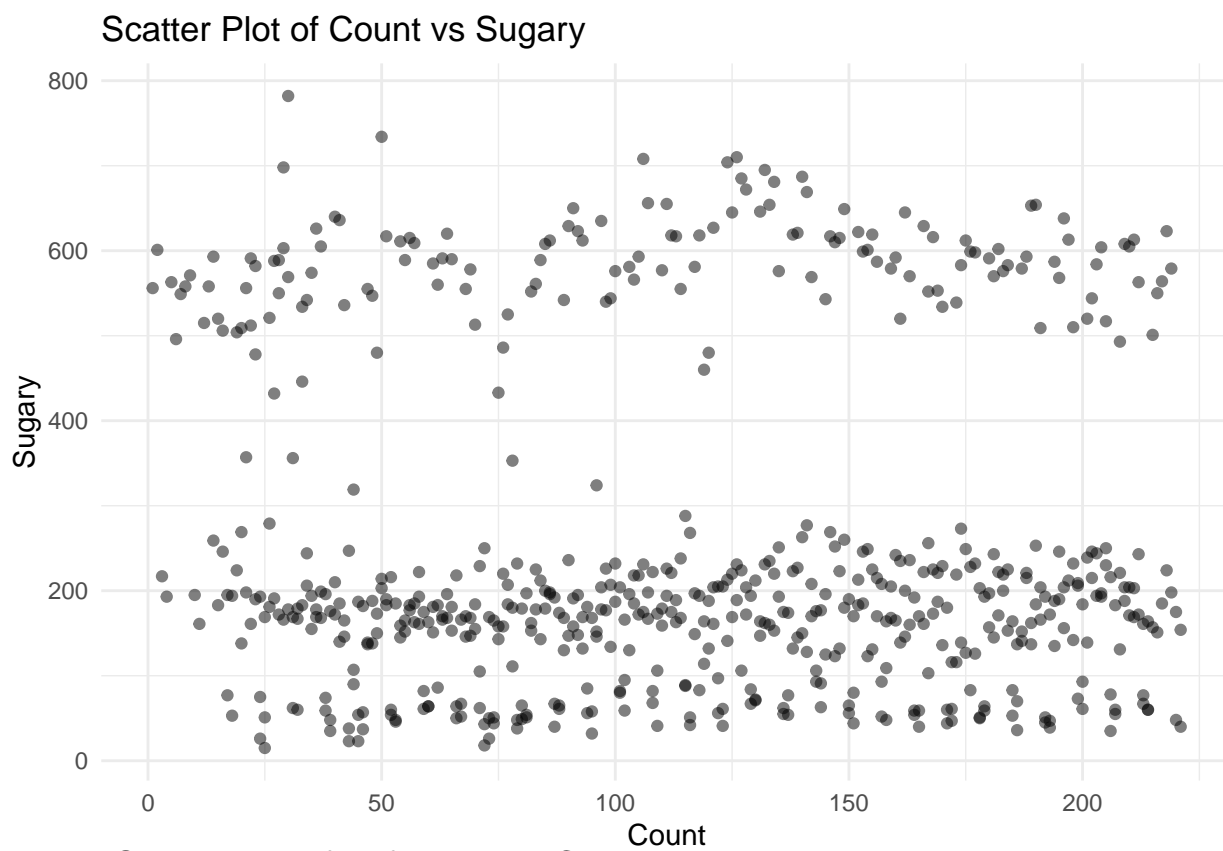## Boxplot of Sugary by Intervention


```
scatter_plots(beverage_sales)
```

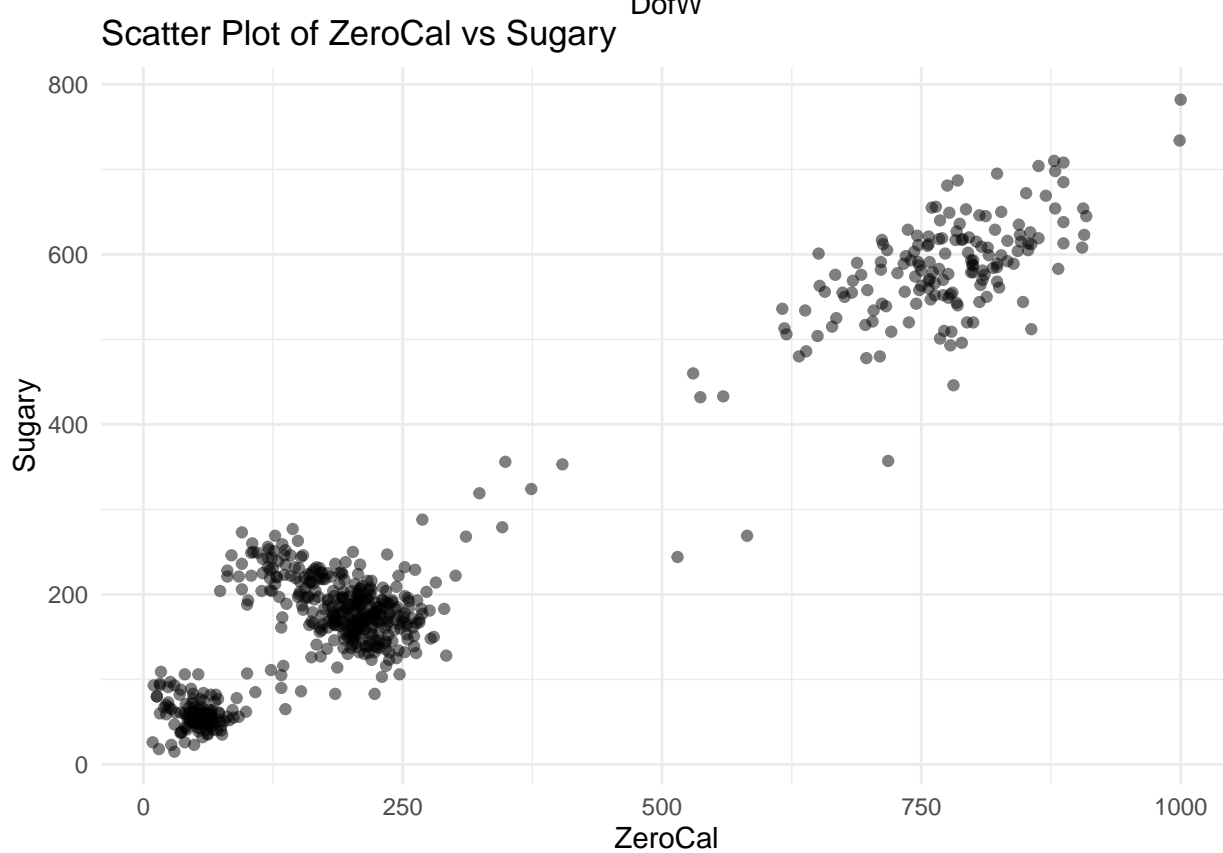## Scatter Plot of Count vs DofW

Scatter Plot of Count vs ZeroCal

Scatter Plot of Count vs Sugary
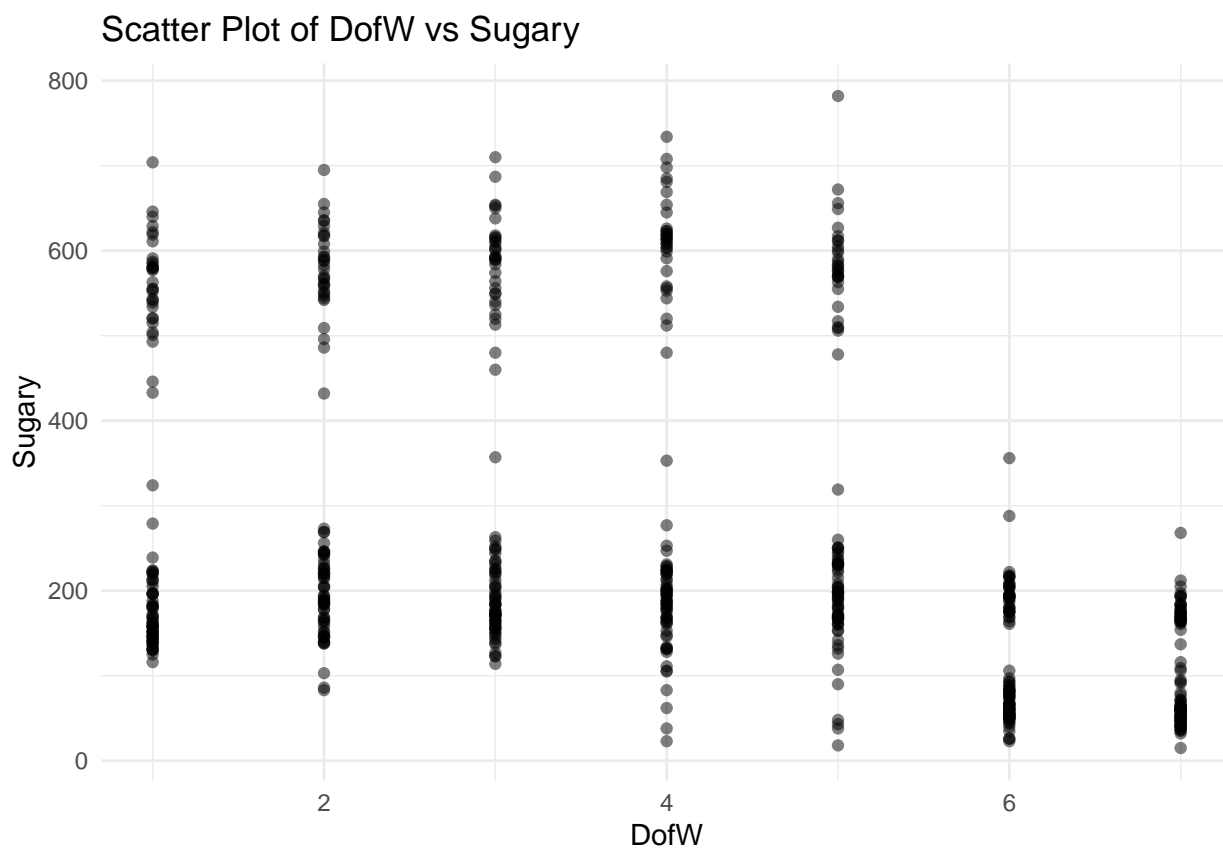

Scatter Plot of DofW vs ZeroCal

Scatter Plot of DofW vs Sugary
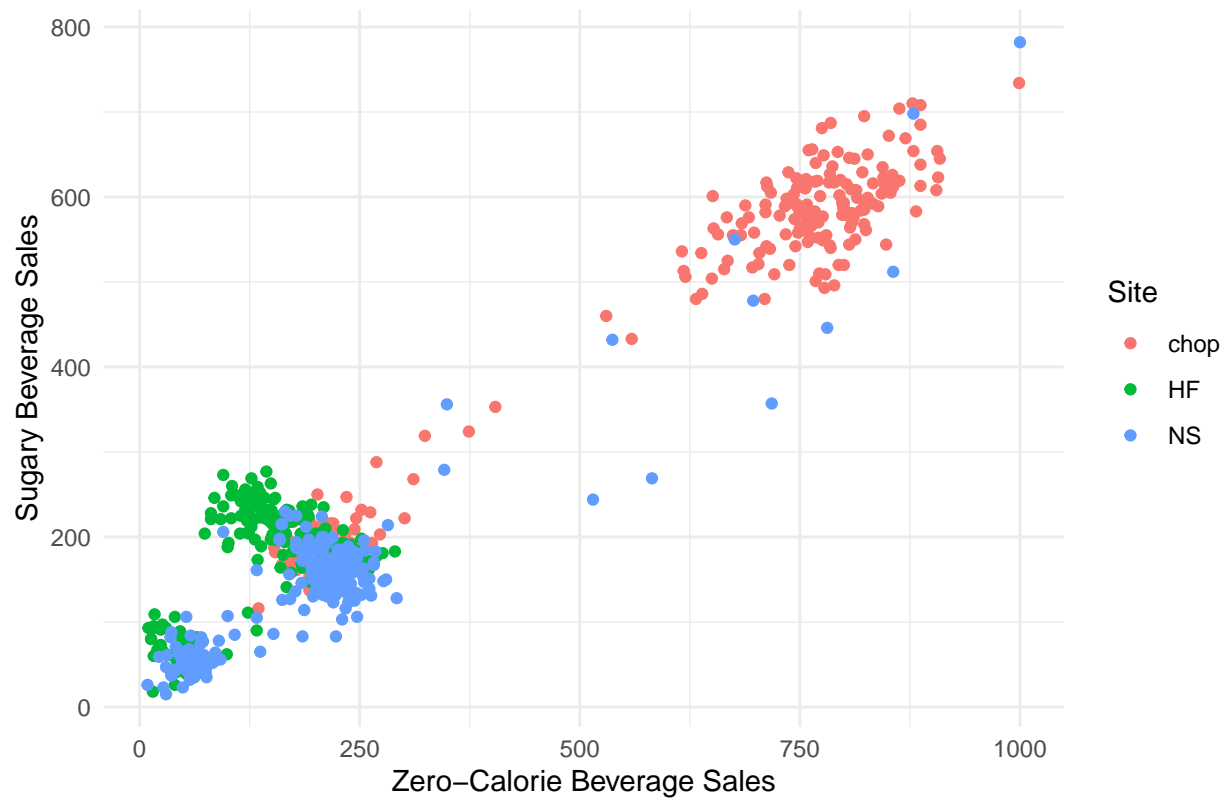

Scatter Plot of ZeroCal vs Sugary

```
plot_beverage_sales_comparison(beverage_sales, "ZeroCal", "Sugary", "Site")
```

```
## Warning: Removed 9 rows containing missing values (`geom_point()`).
```


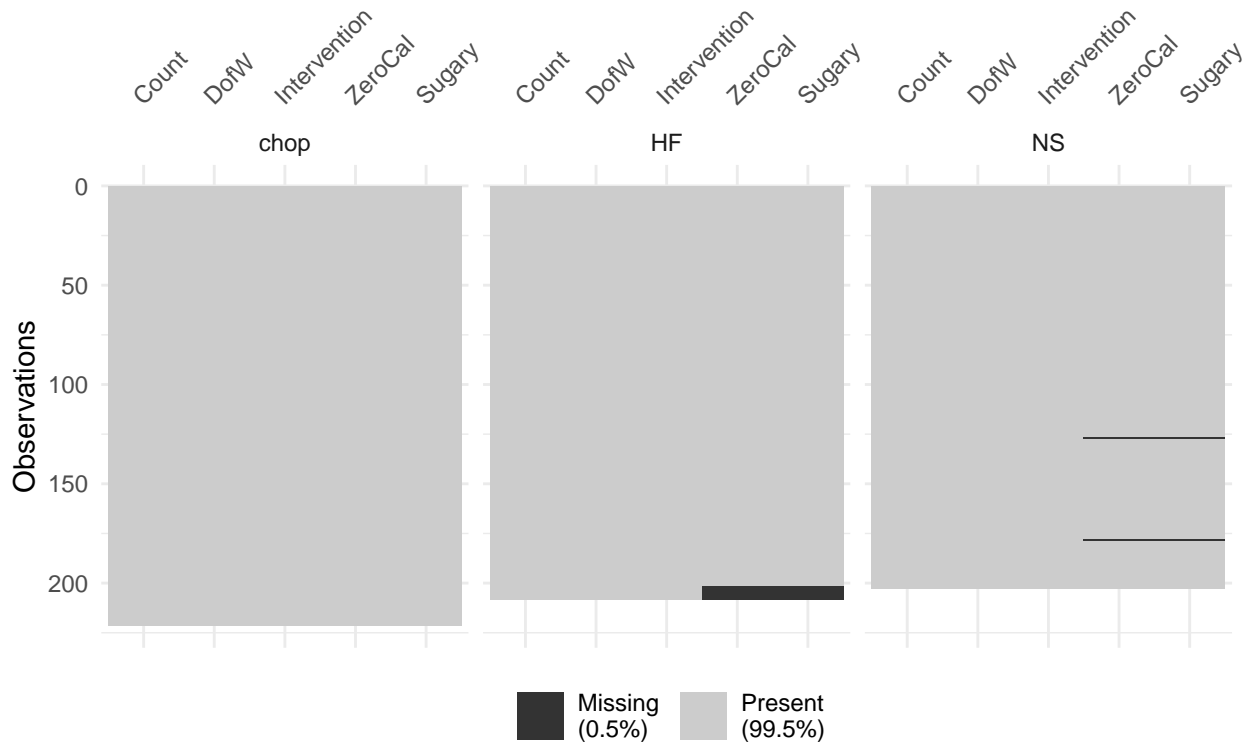Comparison of Zero–Calorie and Sugary Beverage Sales

correlation plot (Johnson)

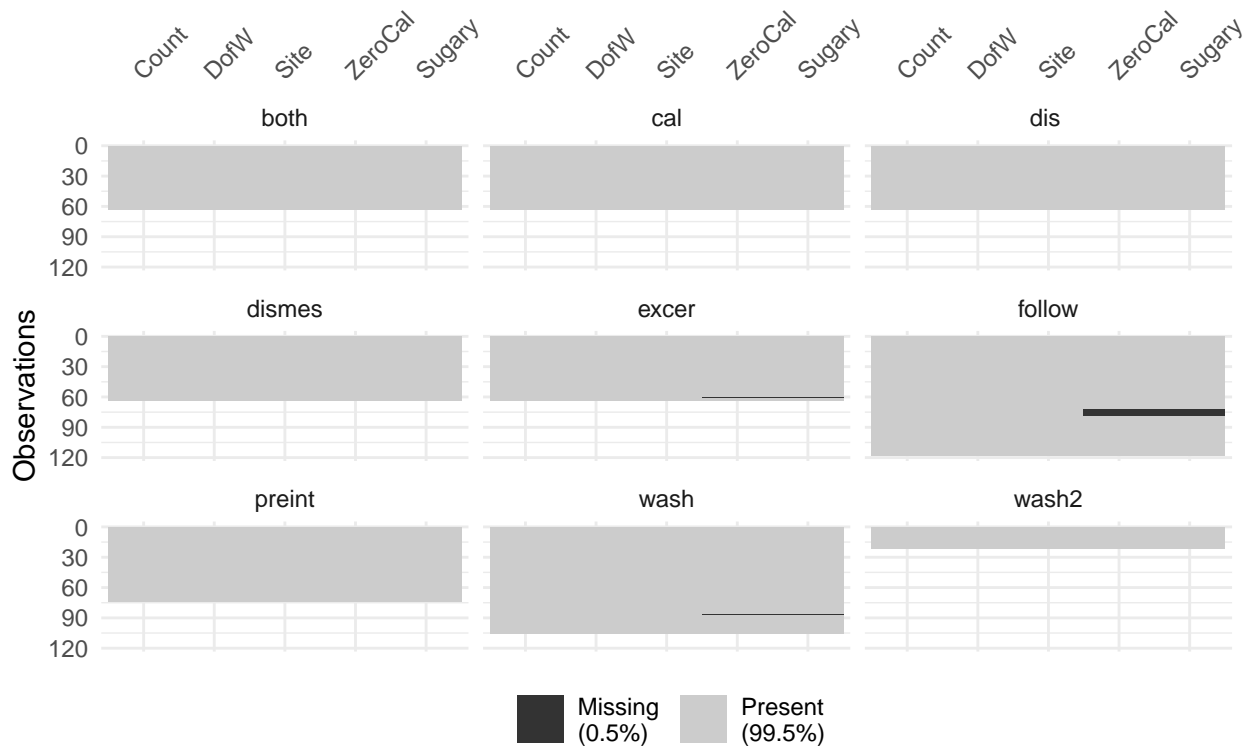**imbalance/missing value (Sarah) visdat**

```
plot_missing_data(beverage_sales, group_by_site=TRUE, group_by_intervention=FALSE)
```

Missing Data and Observation Count by Site


```
plot_missing_data(beverage_sales, group_by_site=FALSE, group_by_intervention=TRUE)
```

Missing Data and Observation Count by Intervention

line plot for trajectory (Par)

4. Formal Analysis

```
# handle_missing_data(beverage_sales)$MissingOverview
```

ITSA (Par)

GEE (Sarah)

LMEM (Johnson)

5. Conclusions

- Recommendations to the clients.

6. References

- Properly formatted citations.

7. Statistical Appendix

- Mathematical formulas.
- Additional tables/figures.