Lab 6.1

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```
library(stat20data)
library(tidyverse)
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.3     v readr     2.1.4
v forcats   1.0.0     v stringr   1.5.0
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 becor
```

```
library(ggplot2)
library(ggthemes)
library (dplyr)
library (infer)
```

```
Attaching package: 'infer'

The following object is masked from 'package:stat20data':

    rep_sample_n
```

Quesion 1

We followed the protocol that was devised on Wednesday without changes.

Question 2

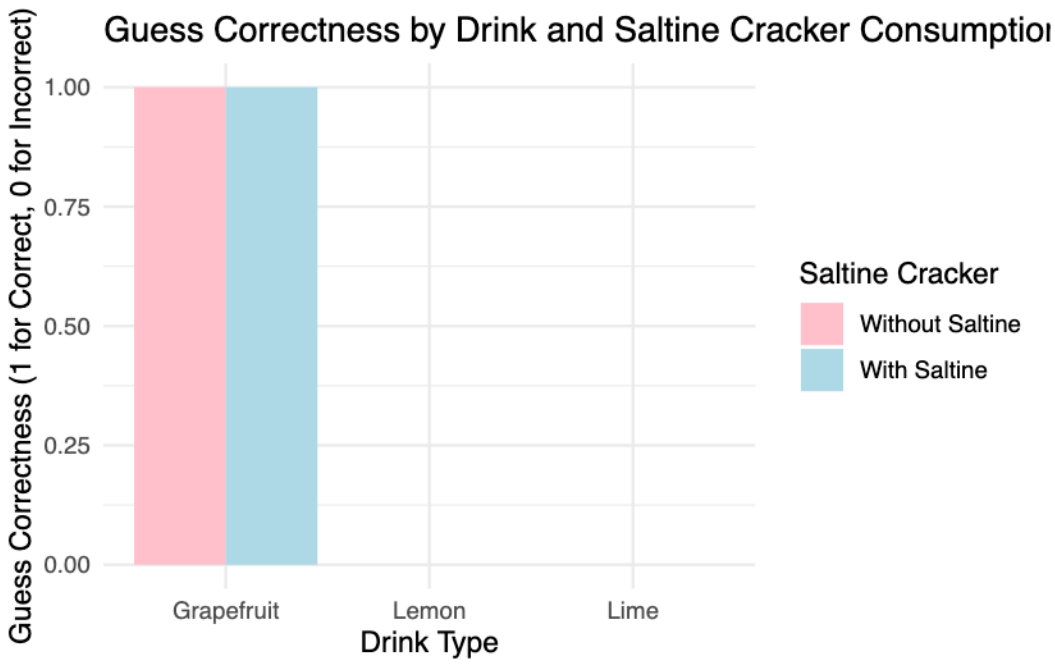
```r
datadrink <- data.frame(
  Saltine = c(FALSE, FALSE, FALSE, TRUE, TRUE, TRUE),
  Drink = c("Grapefruit", "Lime", "Lemon", "Lime", "Grapefruit", "Lemon"),
  Guess = c(1, 0, 0, 0, 1, 0)
)

datadrink
```

```
  Saltine      Drink Guess
1   FALSE Grapefruit     1
2   FALSE       Lime     0
3   FALSE      Lemon     0
4    TRUE       Lime     0
5    TRUE Grapefruit     1
6    TRUE      Lemon     0
```

The data frame looks like the one sketched into the experimental protocol, only that Grapefuit is fully written instead of "grape".

Question 3

```r
ggplot(datadrink, aes(x = Drink, y = Guess, fill = Saltine)) +
  geom_bar(stat = "identity", position = position_dodge()) +
  scale_fill_manual(values = c("pink", "lightblue"), labels = c("Without Saltine", "With S
  labs(title = "Guess Correctness by Drink and Saltine Cracker Consumption",
       x = "Drink Type",
       y = "Guess Correctness (1 for Correct, 0 for Incorrect)",
       fill = "Saltine Cracker") +
  theme_minimal()
```



Visually representing the empirical data from the taste testing, Grapefruit was guessed correctly both times (with and without the saltine) represetnted by a 1. Lemon and Lime were guessed incorrectly both times (with and without the saltin) represented by 0s. From this visualization, we can see that the outcomes are identicial with and without the saltine. This supports the null hypothesis that the saltine cracker has no effect, and thus we cannot reject the null hypothesis with the data. This would be contrary to the claim of our alternate hypothesis of which there is an effect.

Question 4

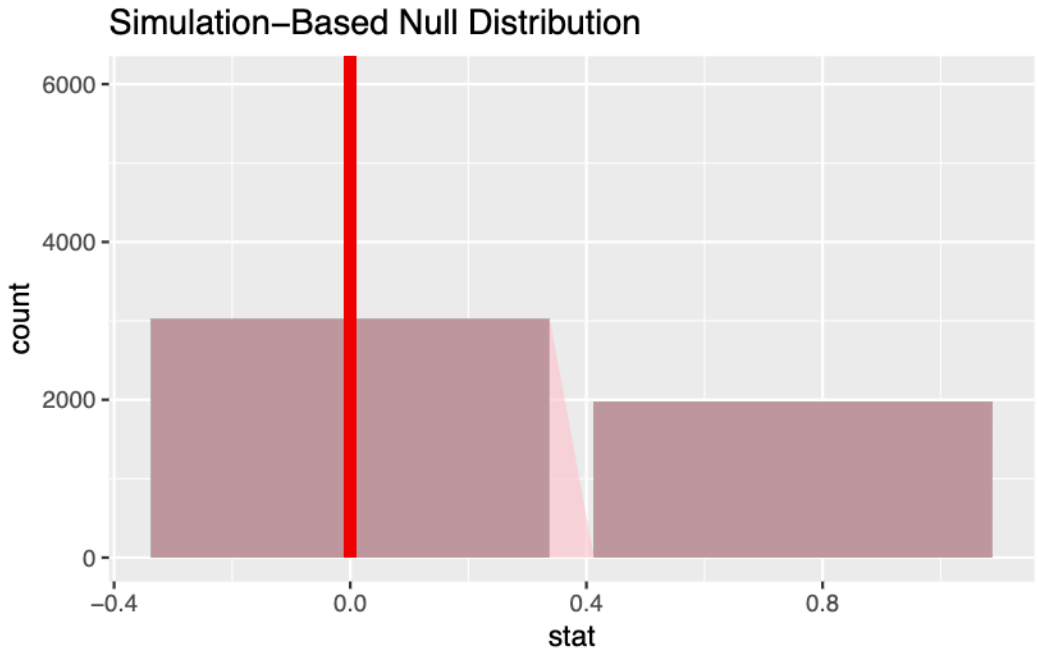
```
datadrink$Guess <- as.factor(datadrink$Guess)

obs_stat <- datadrink %>%
  specify(response = Guess, success = "1", explanatory = Saltine) %>%
  calculate(stat = "Chisq")
```

```
Warning: The statistic is based on a difference or ratio; by default, for
difference-based statistics, the explanatory variable is subtracted in the
order "TRUE" - "FALSE", or divided in the order "TRUE" / "FALSE" for
ratio-based statistics. To specify this order yourself, supply `order =
c("TRUE", "FALSE")` to the calculate() function.
```

```r
null_dist <- datadrink %>%
  specify(response = Guess, success = "1", explanatory = Saltine) %>%
  hypothesize(null = "independence") %>%
  generate(reps = 5000, type = "permute") %>%
  calculate(stat = "Chisq")
```

```
Warning: The statistic is based on a difference or ratio; by default, for
difference-based statistics, the explanatory variable is subtracted in the
order "TRUE" - "FALSE", or divided in the order "TRUE" / "FALSE" for
ratio-based statistics. To specify this order yourself, supply `order =
c("TRUE", "FALSE")` to the calculate() function.
```

```r
null_plot <- null_dist %>%
  visualize() +
  shade_p_value(obs_stat, direction = "both")

print(null_plot)
```




```r
p_value <- null_dist %>%
  get_p_value(obs_stat, direction = "both")
```

```r
print(p_value)
```

```
# A tibble: 1 x 1
  p_value
    <dbl>
1       1
```

```r
conclusion <- ifelse(p_value < 0.05,
                     "Reject the null hypothesis: There is a significant association betwe
                     "Fail to reject the null hypothesis: There is no significant associat

print(conclusion)
```

```
     p_value
[1,] "Fail to reject the null hypothesis: There is no significant association between Saltin
```

Question 5

Because we did not find a significant effect, we could increase the number of saltine crackers that the test subject consumes to see if the texture and flavor of the larger number of saltine crackers affect their sense of taste furthermore. Another way we could change our protocol is by introducing a different factor into the hypothesis instead of the saltine crackers, something more potent that would have a greater impact on the test subject's taste buds such as spicy chips or any other spicy food and then see how the results play out from there.