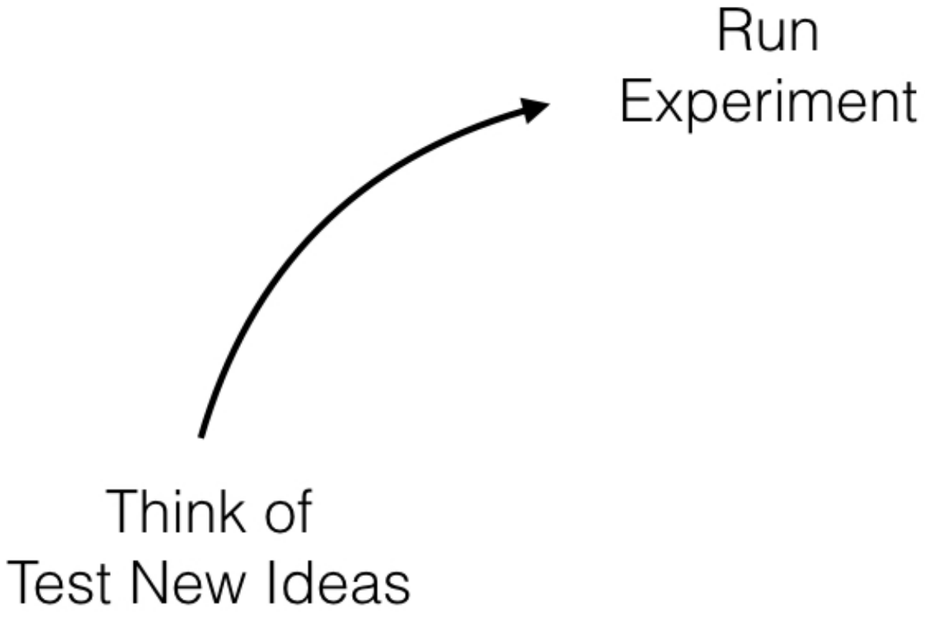
Introduction

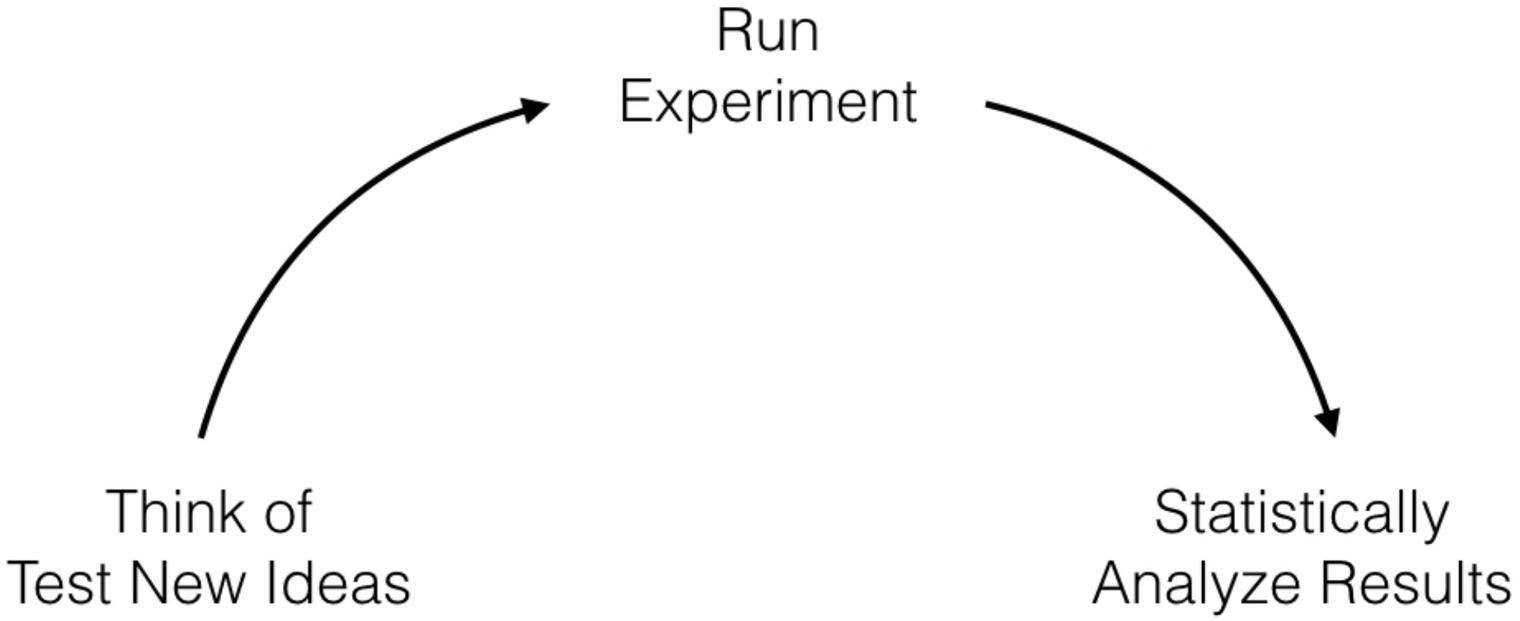
INTRODUCTION TO A/B TESTING IN R

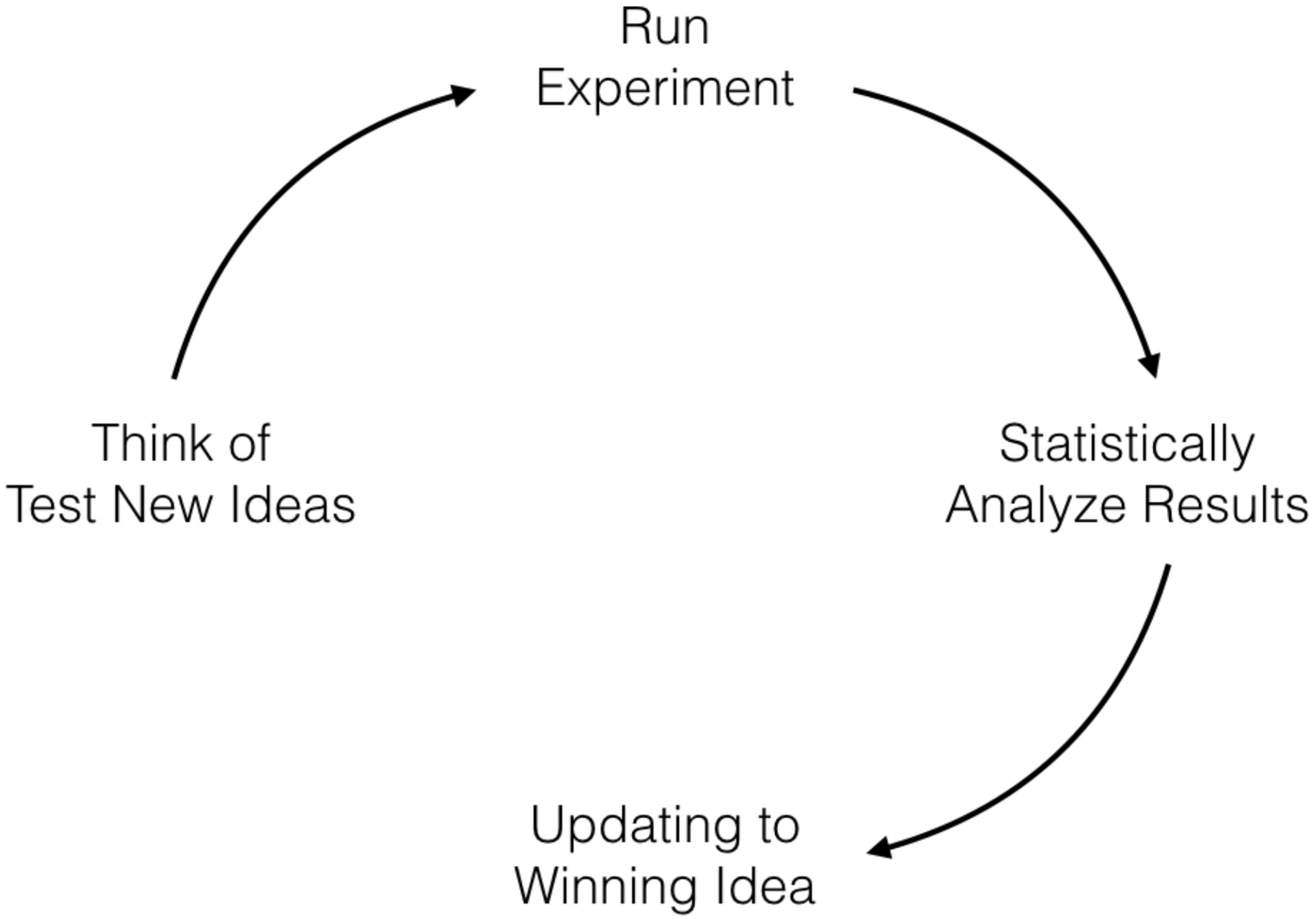
Page Piccinini
Instructor

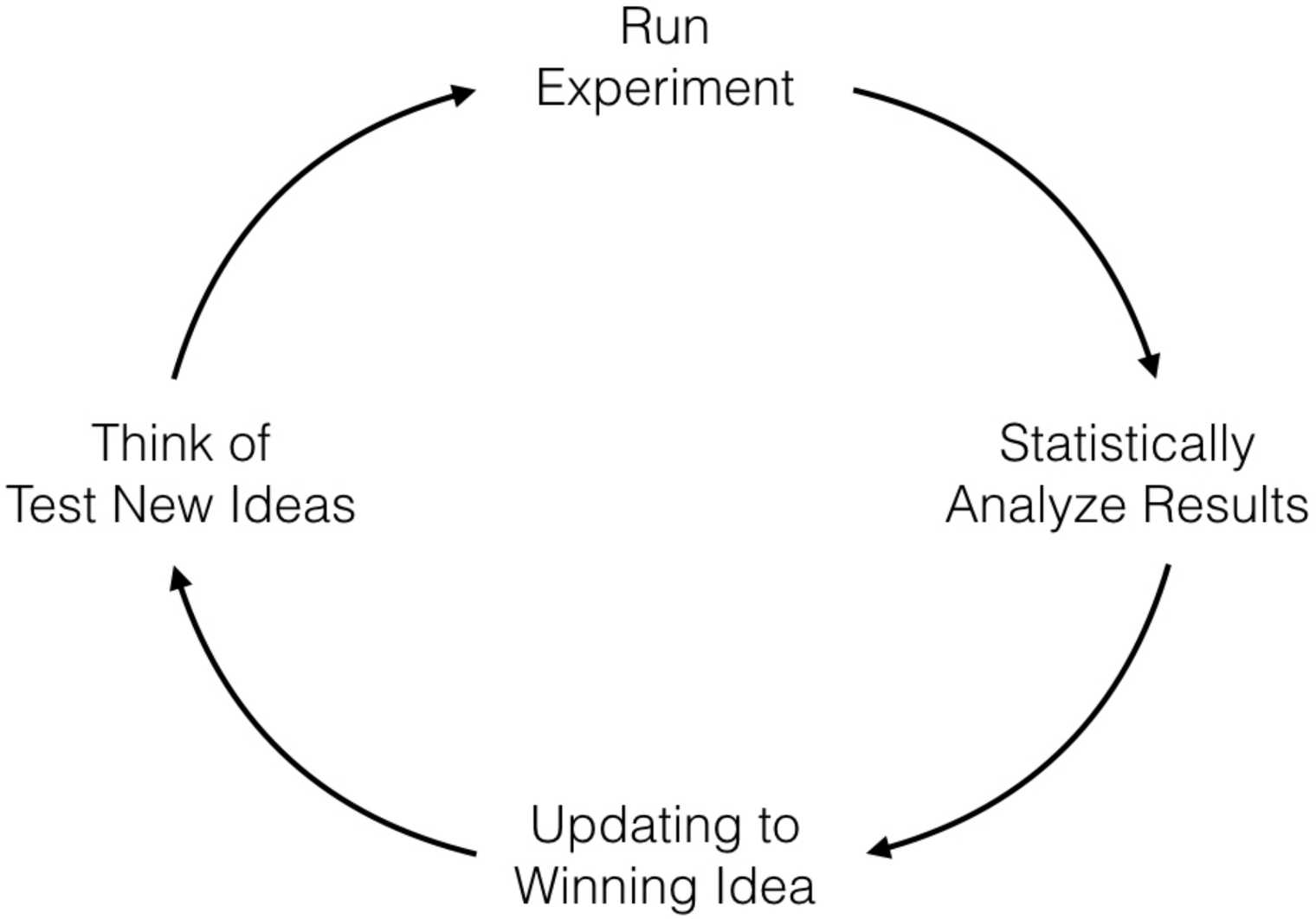
datacamp

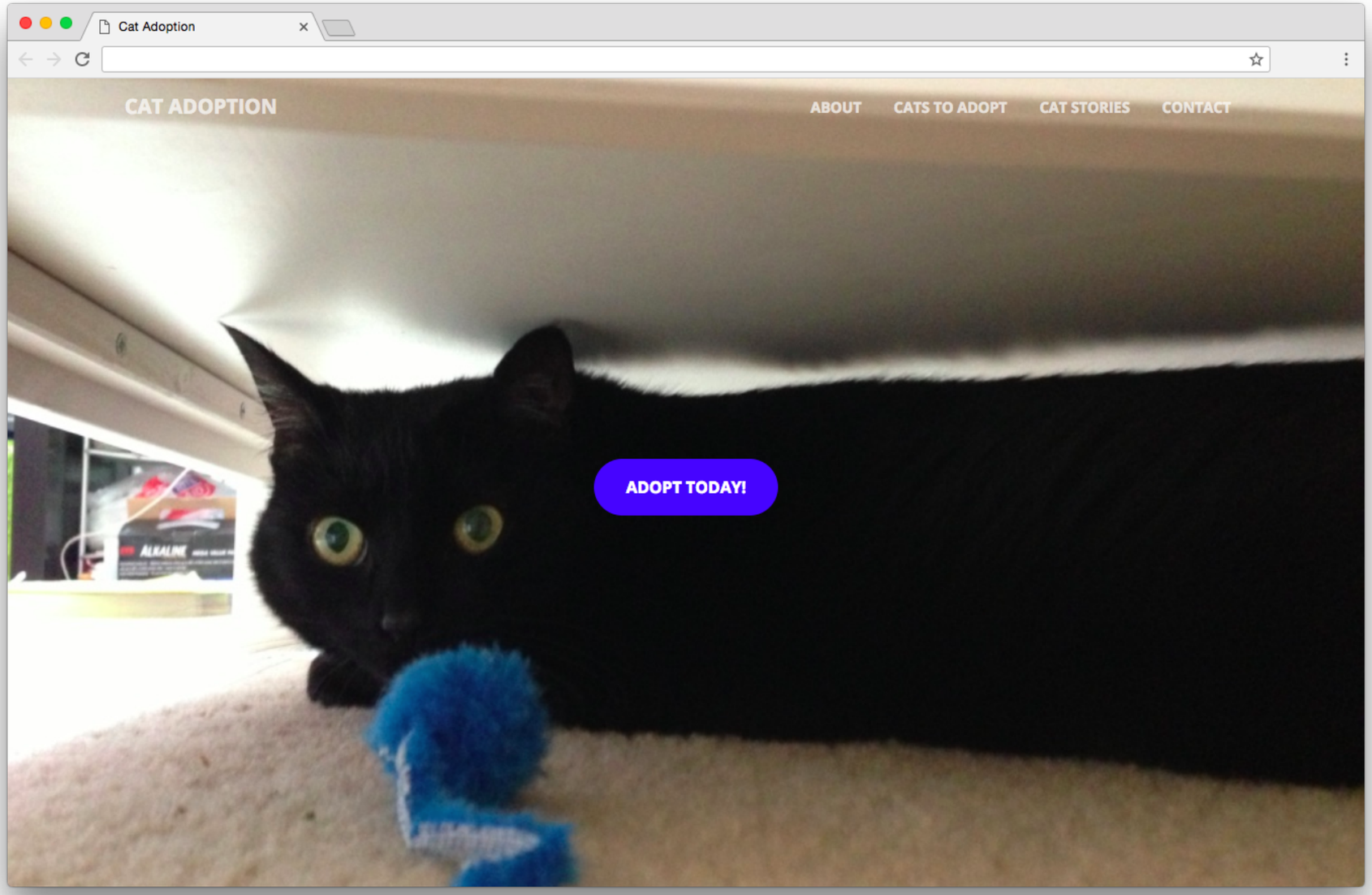
Think of
Test New Ideas

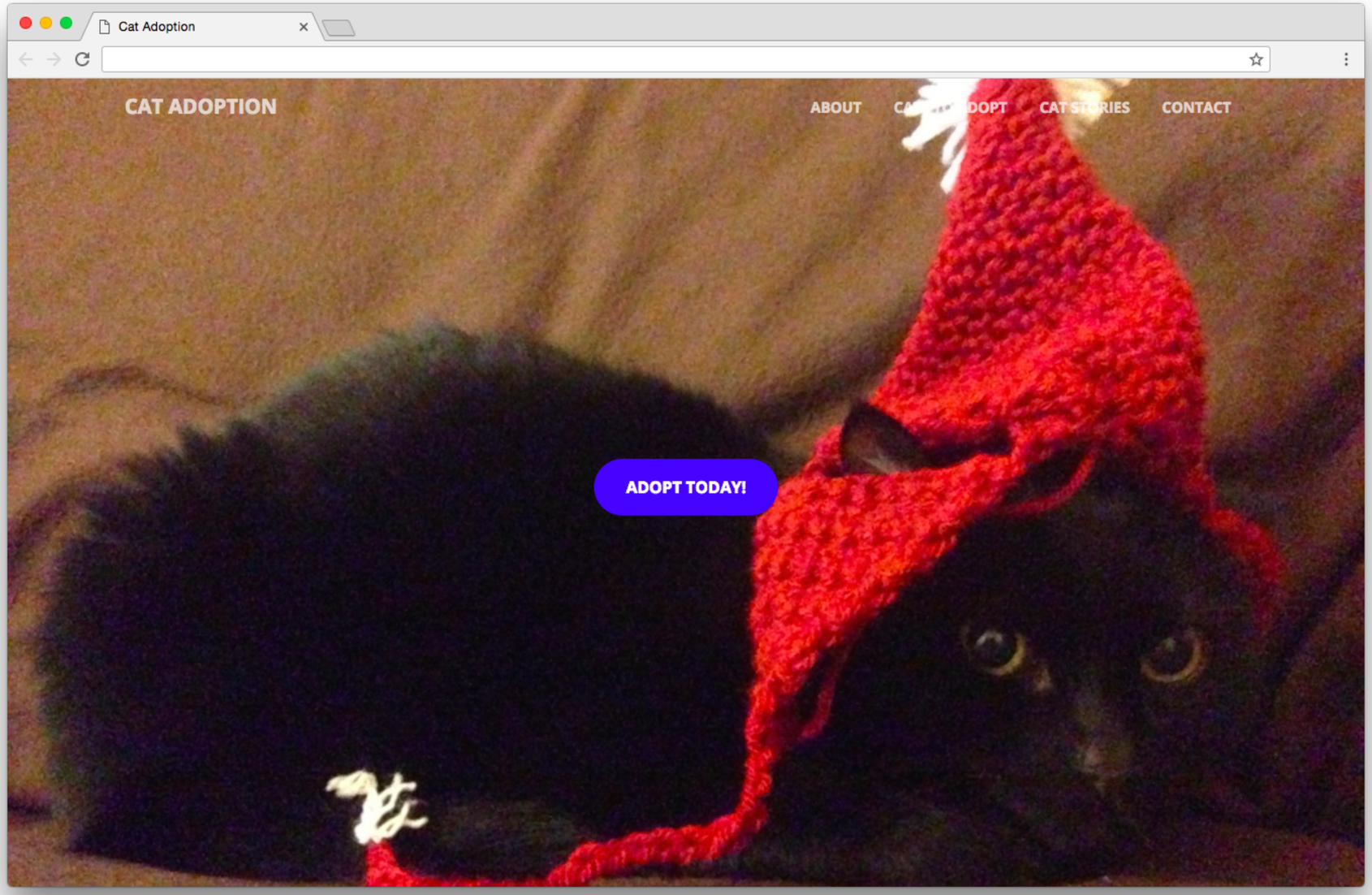

Run
Experiment
Think of
Test New Ideas


Run
Experiment
Think of
Test New Ideas
Statistically
Analyze Results


Run
Experiment
Statistically
Analyze Results
Updating to
Winning Idea
Think of
Test New Ideas


Run
Experiment
Statistically
Analyze Results
Updating to
Winning Idea
Think of
Test New Ideas


Cat Adoption
CAT ADOPTION
ABOUT
CATS TO ADOPT
CAT STORIES
CONTACT
ADOPT TODAY!


Cat Adoption
CAT ADOPTION
ABOUT
CONTACT
ADOPT TODAY!

Variables

- **Question:** Will changing the homepage photo result in more "ADOPT TODAY" clicks?
- **Hypothesis:** Using a photo of a cat wearing a hat will result in more "ADOPT TODAY!" clicks.
- **Dependent variable:** Clicked "ADOPT TODAY!" button or not.
- **Independent variable:** Homepage photo.

Preliminary dataset

```
library(tidyverse)
click_data <- read_csv("click_data.csv")
click_data
```

```
# A tibble: 3,650 x 2
   visit_date clicked_adopt_today
       <date>               <int>
 1 2017-01-01                   1
 2 2017-01-02                   1
 3 2017-01-03                   0
 4 2017-01-04                   1
 5 2017-01-05                   1
 6 2017-01-06                   0
 7 2017-01-07                   0
# ... with 3,643 more rows
```

Let's practice!

INTRODUCTION TO A/B TESTING IN R

Baseline Conversion Rates

INTRODUCTION TO A/B TESTING IN R

Page Piccinini
Instructor

Hypothesis: Using a photo of a cat wearing a hat will result in more "ADOPT TODAY!" clicks.

Hypothesis: Using a photo of a cat wearing a hat will result in **more** "ADOPT TODAY!" clicks.

Hypothesis: Using a photo of a cat wearing a hat will result in **more** "ADOPT TODAY!" clicks.

conversion rate
last year*?*

Hypothesis: Using a photo of a cat wearing a hat will result in **more** "ADOPT TODAY!" clicks.

conversion rate ***last year****?*

conversion rate ***today****?*

Hypothesis: Using a photo of a cat wearing a hat will result in **more** "ADOPT TODAY!" clicks.

conversion rate ***last year****?*

conversion rate ***today****?*

conversion rate ***next week****?*

Hypothesis: Using a photo of a cat wearing a hat will result in **more** "ADOPT TODAY!" clicks.

conversion rate ***last year****?*

conversion rate ***today****?*

conversion rate ***next week****?*

Current conversion rate

```
library(tidyverse)
click_data <- read_csv("click_data.csv")
click_data
click_data %>%
   summarize(conversion_rate = mean(clicked_adopt_today))
```

```
# A tibble: 1 x 1
  conversion_rate
            <dbl>
1       0.2772603
```

Current conversion rate seasonality

```
library(tidyverse)


click_data <- read_csv("click_data.csv")
click_data
click_data %>%

   summarize(conversion_rate = mean(clicked_adopt_today))
```

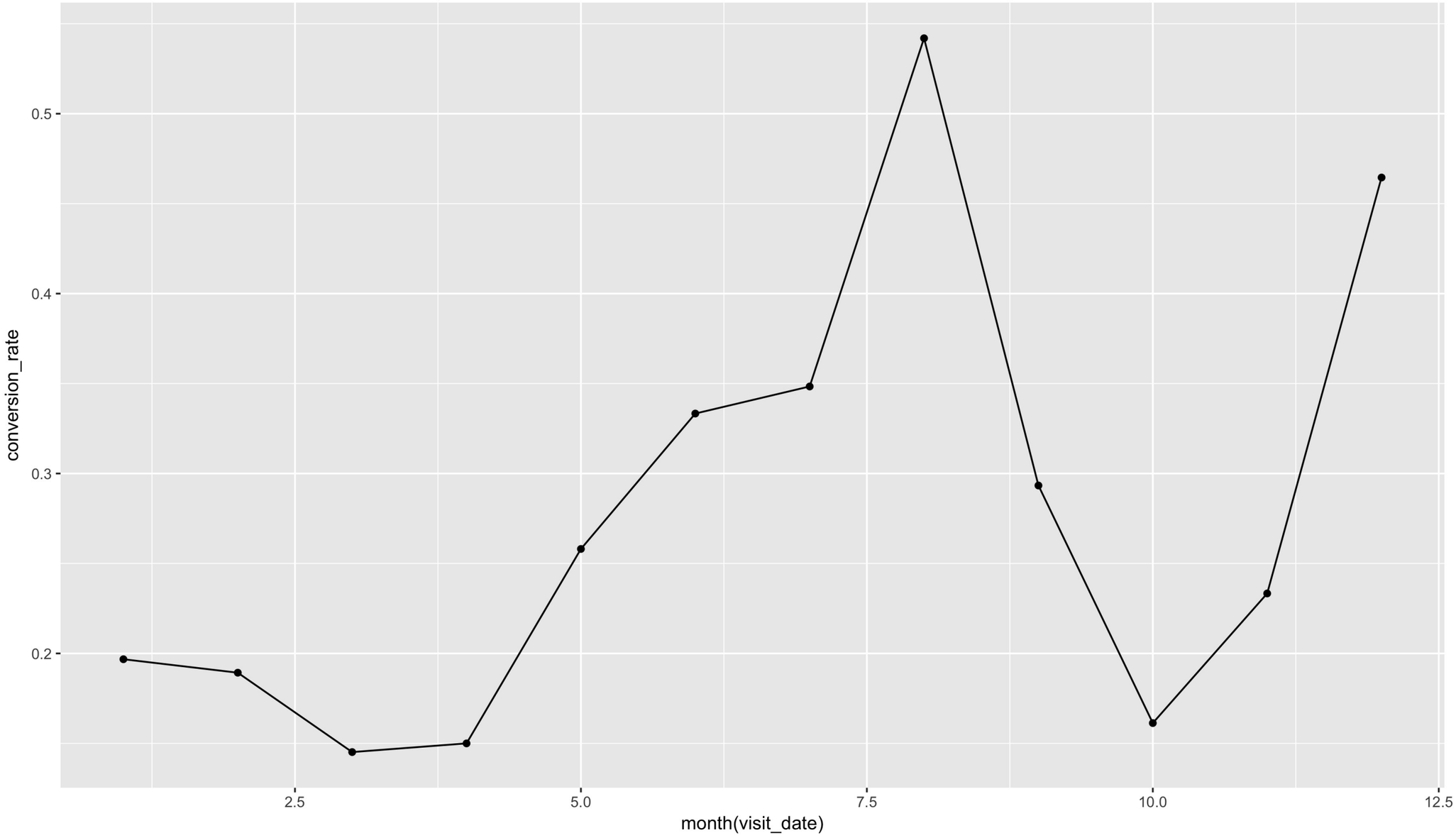
Current conversion rate seasonality

```
library(tidyverse)
library(lubridate)
click_data <- read_csv("click_data.csv")
click_data
click_data %>%
  group_by(month(visit_date)) %>%
  summarize(conversion_rate = mean(clicked_adopt_today))
```

```
# A tibble: 12 x 2
   `month(visit_date)` conversion_rate
                 <dbl>           <dbl>
 1                   1       0.1967742
 2                   2       0.1892857
 3                   3       0.1451613
...
```

Plotting current conversion rate seasonality

```
library(tidyverse)
library(lubridate)
click_data <- read_csv("click_data.csv")
click_data
click_data_sum <- click_data %>%
  group_by(month(visit_date)) %>%
  summarize(conversion_rate = mean(clicked_adopt_today))
ggplot(click_data_sum, aes(x = `month(visit_date)`, y = conversion_rate)) +
  geom_point() +
  geom_line()
```


0.5
0.4
0.3
0.2
conversion_rate
2.5
5.0
7.5
10.0
12.5
month(visit_date)

Let's practice!

INTRODUCTION TO A/B TESTING IN R

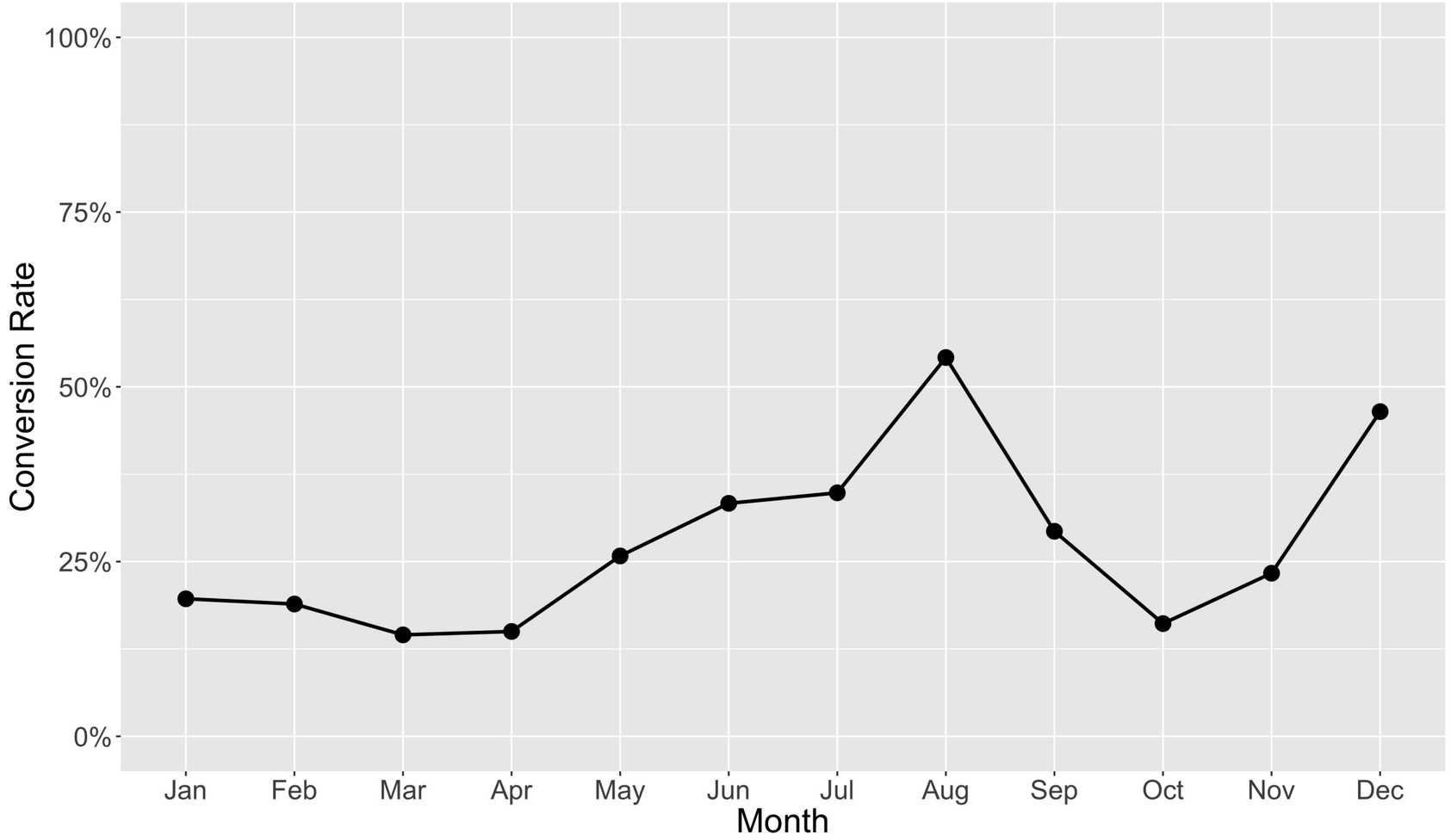
Designing an Experiment - Power Analysis

INTRODUCTION TO A/B TESTING IN R

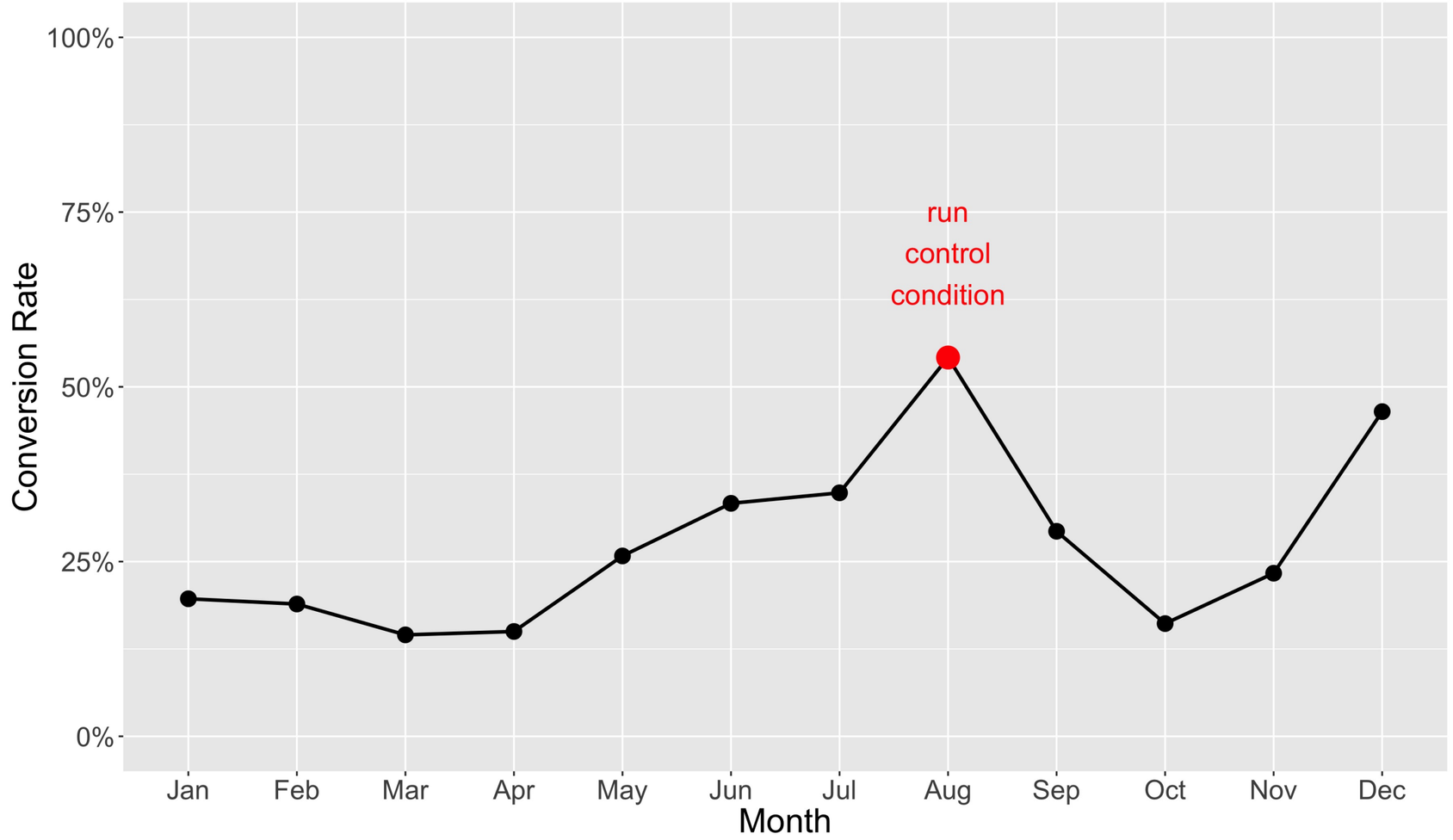
Page Piccinini
Instructor

datacamp

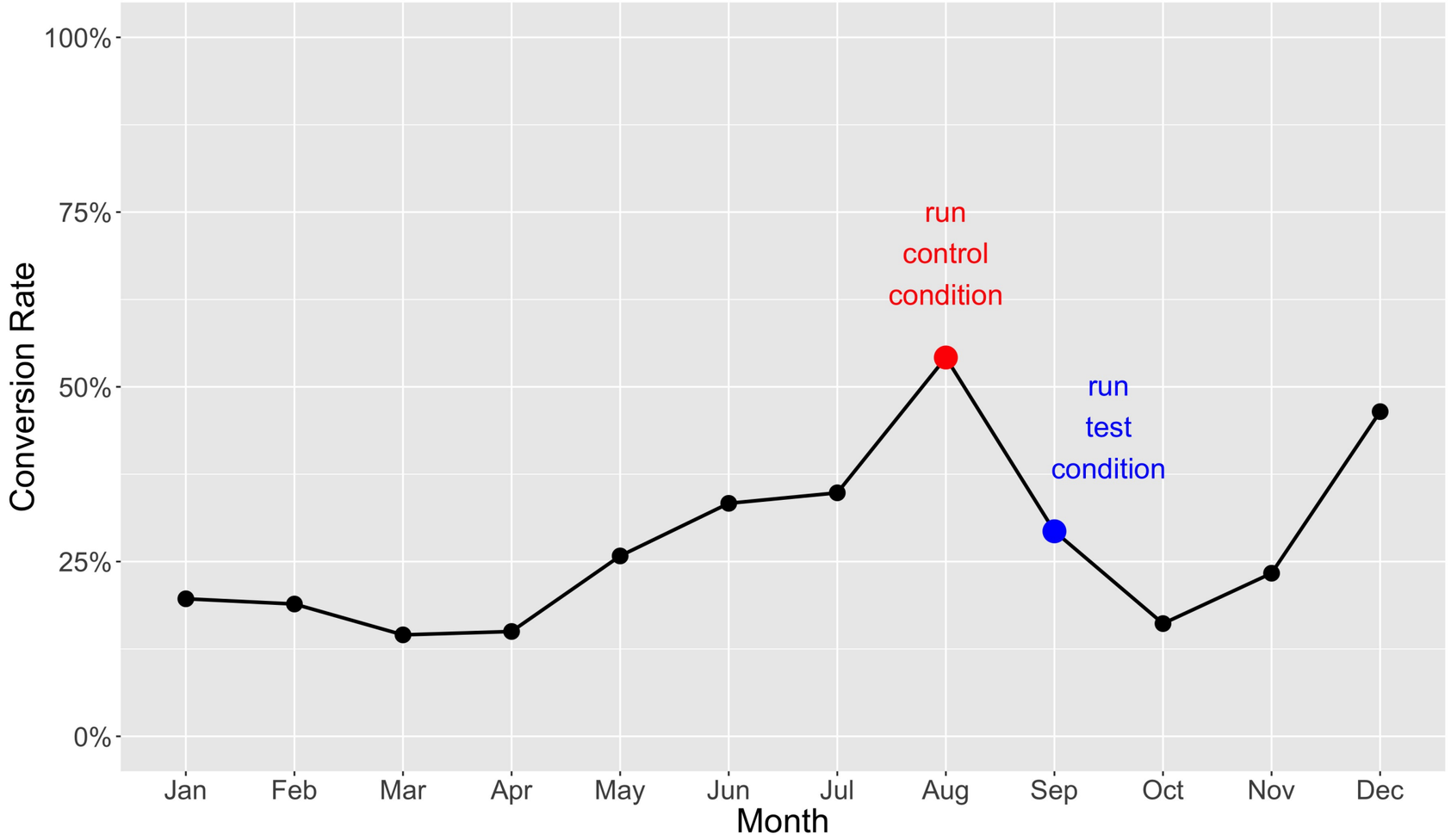
Conversion rate seasonality



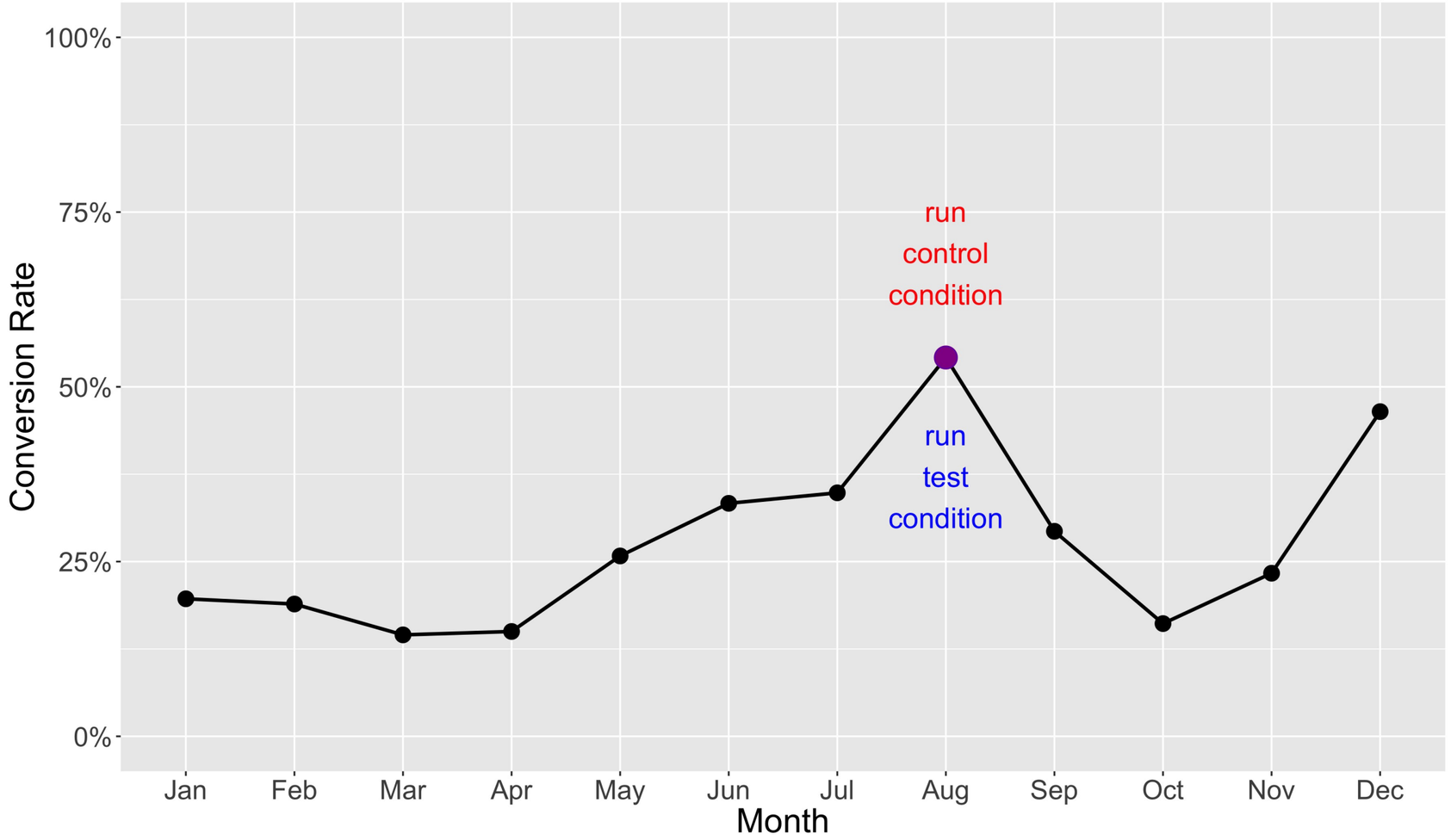
Conversion rate seasonality



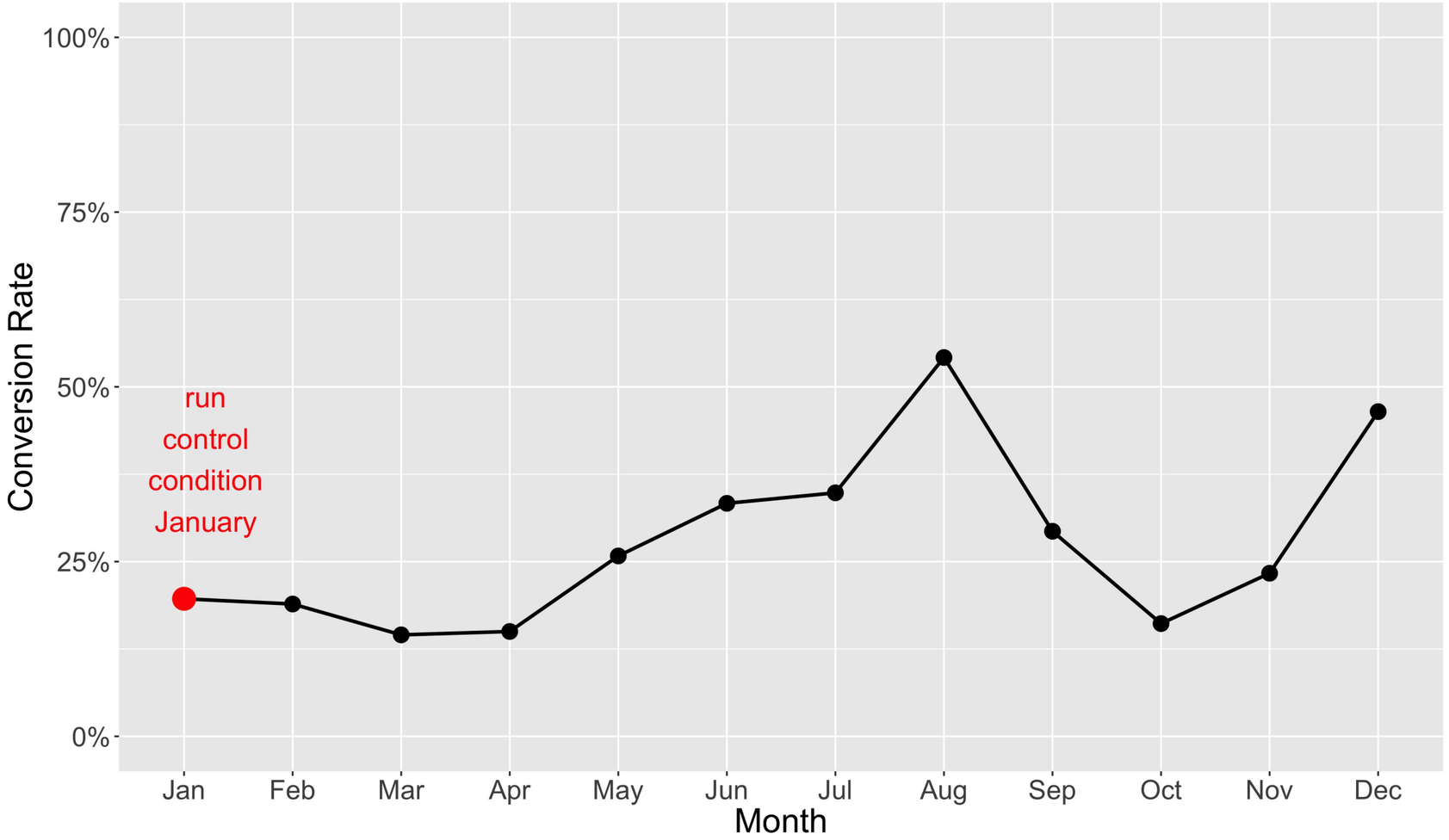
Conversion rate seasonality



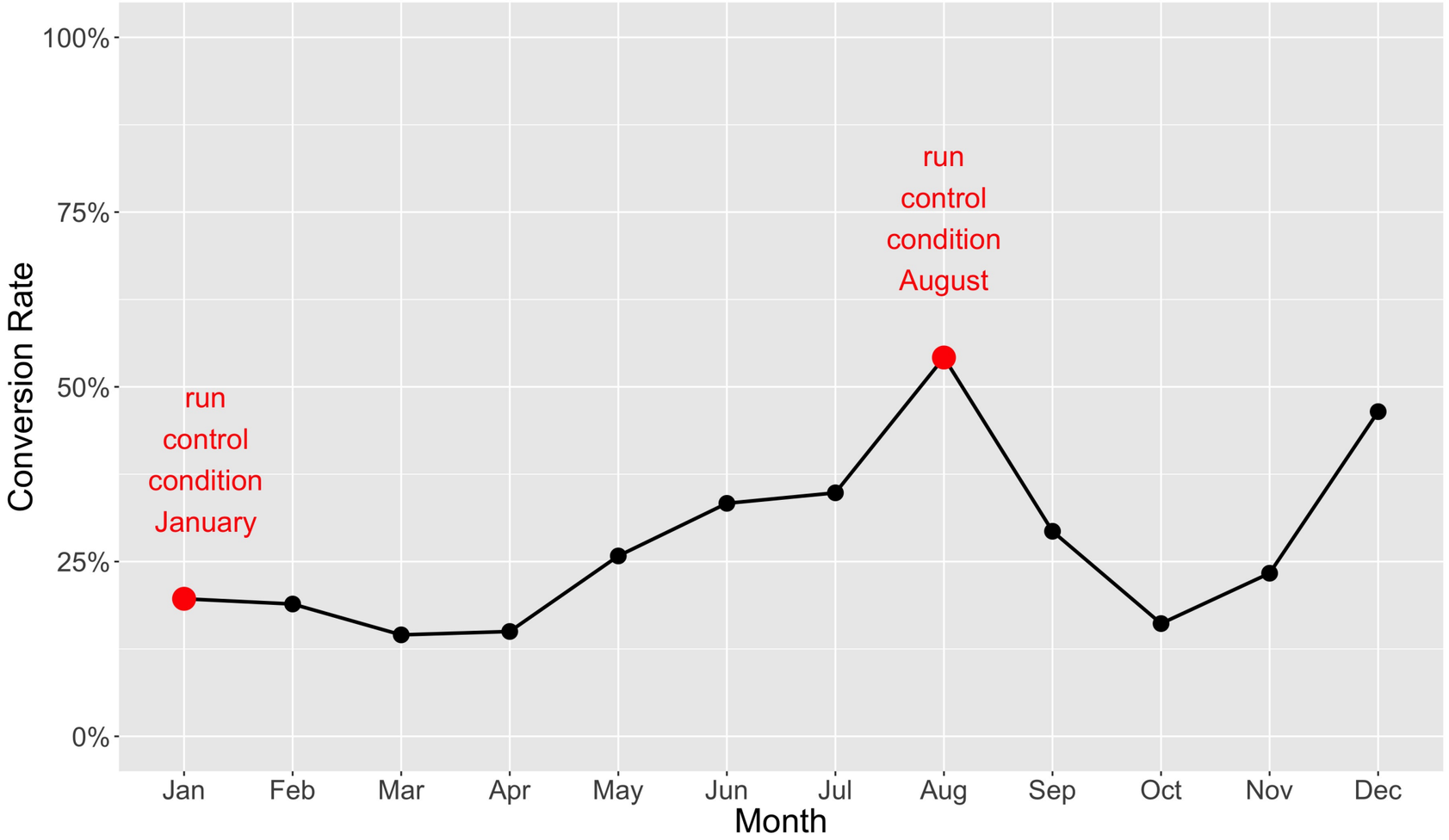
Conversion rate seasonality



Conversion rate seasonality



Conversion rate seasonality



Power analysis

- **statistical test** - statistical test you plan to run
- **baseline value** - value for the current control condition
- **desired value** - expected value for the test condition
- **proportion of the data** from the test condition (ideally 0.5)
- **significance threshold / alpha** - level where effect significant (generally 0.05)
- **power / 1 - beta** - probability correctly rejecting null hypothesis (generally 0.8)

Power analysis in R

```
library(powerMediation)
total_sample_size <- SSizeLogisticBin(




                                      )
```

Power analysis in R

```
library(powerMediation)
total_sample_size <- SSizeLogisticBin(

                                      B = 0.5,
                                      alpha = 0.05,
                                      power = 0.8)
```

Power analysis in R

```
library(powerMediation)
total_sample_size <- SSizeLogisticBin(p1 = 0.2,
                                      p2 = 0.3,
                                      B = 0.5,
                                      alpha = 0.05,
                                      power = 0.8)
```

```
total_sample_size
total_sample_size / 2
```

```
587
293.5
```

Let's practice!

INTRODUCTION TO A/B TESTING IN R