FASHION BRAND EXPERIMENT

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Our Team

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OVERVIEW OF EXPERIMENT

OUR EXPERIMENT

The goal of our experiment is to find out how brand name affects the preference of clothing products, especially amongst young consumers.

Thus we conducted a survey to measure how people's preferences change among very similar designed clothing of **high-end brands** and **fast fashion brands**.

Branded Clothing

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METHODOLOGY

One long survey with a lot of logics

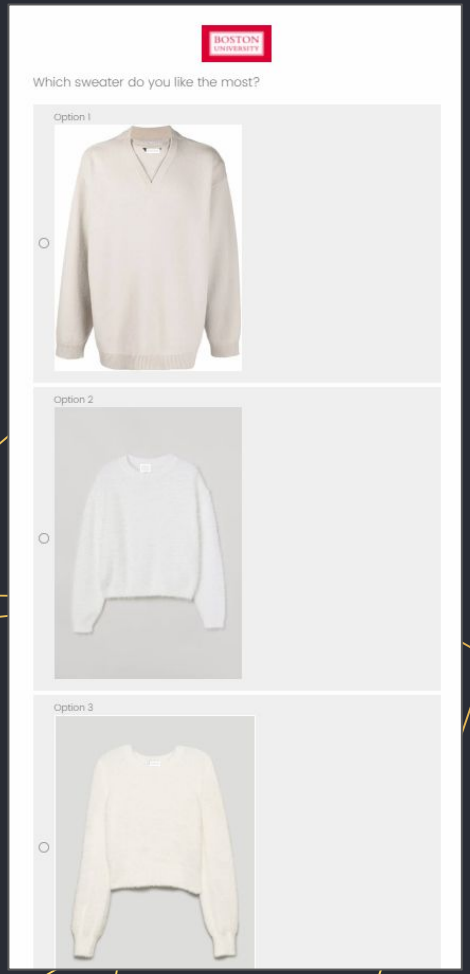
Control/Treatment randomization
Randomization in individual level

Question randomization
Randomly assigning 10 questions to participants

Question choices randomization
Randomly assigning all 3 choices in each question

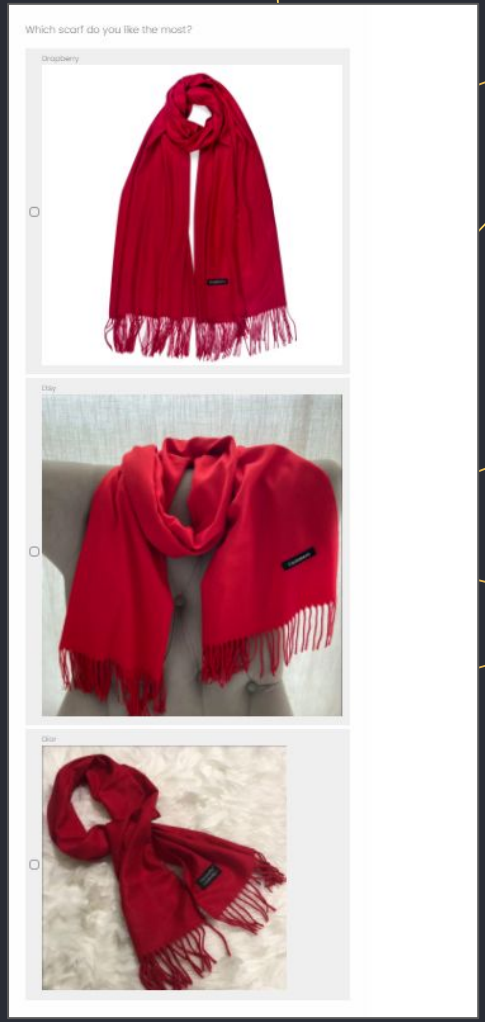
Survey display logic
Match gender question to displaying right question to the right gender (blocking method)

Scoring
Match each high-brand choices to the scores



QUALTRICS Survey

Here is 2 samples of our control and treatment surveys for female groups



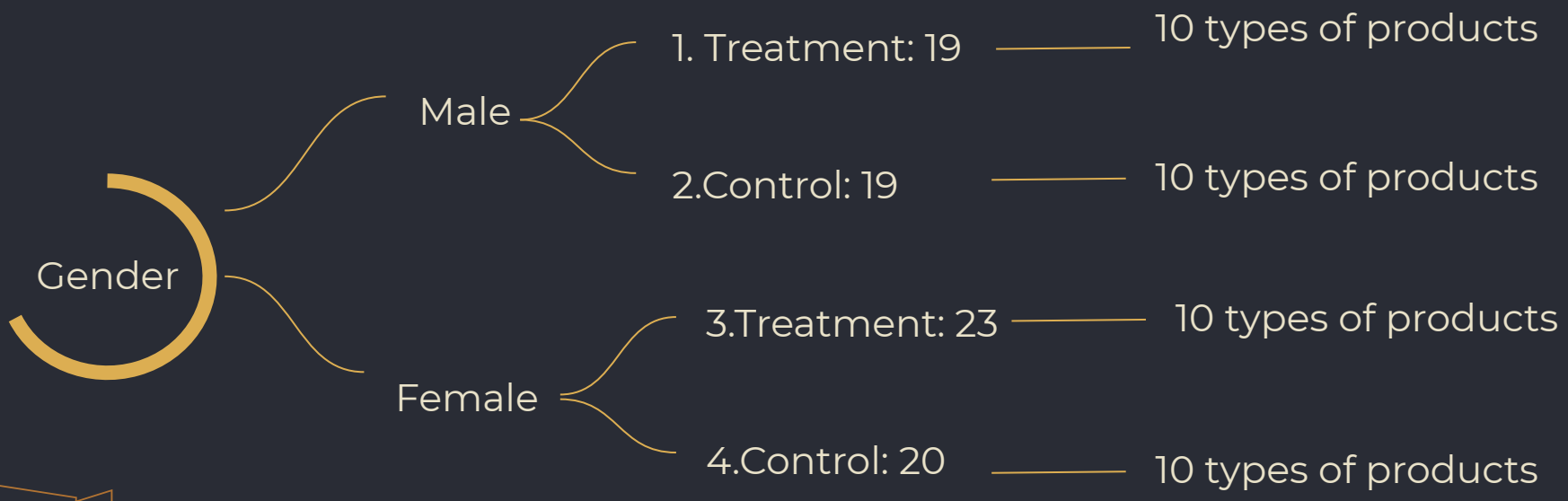
Procedure

who contact	F/M	Done
Sally	F	✓
Caroline	M	✓
Chris	M	✓
Linh	F	✓

Conducted surveys on graduate students in BU and other institutes

Google spreadsheet to track progress to avoid duplicates

Result


Gender
Male
1. Treatment: 19
10 types of products
2.Control: 19
10 types of products
Female
3.Treatment: 23
10 types of products
4.Control: 20
10 types of products

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EXPLORATORY DATA ANALYSIS

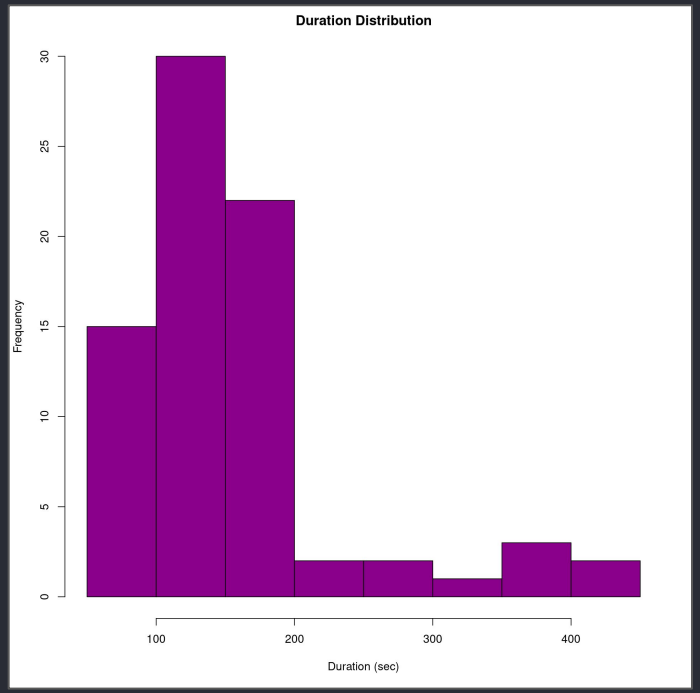
Number of Treatment and Control Samples

any_treatment <int>	gender <dbl>	num_observation <int>
0	0	18
0	1	20
1	0	18
1	1	21

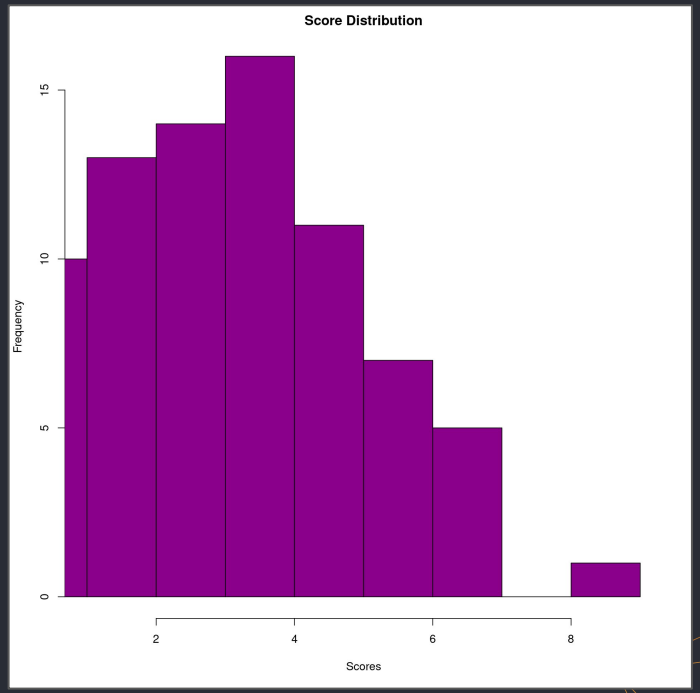
any_treatment
0 = Control
1 = Treatment

gender
0 = Male
1 = Female

Distributions of Score and Duration



Median = 137



Median = 4

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AVERAGE TREATMENT EFFECT

Estimate Average Treatment Effect

simple_reg <- feols(score ~ any_treatment, data=data, se='white')

```
> summary(simple_reg)
OLS estimation, Dep. Var.: score
Observations: 77
Standard-errors: Heteroskedasticity-robust
               Estimate Std. Error t value  Pr(>|t|)
(Intercept)       3.421      0.231   14.79 < 2.2e-16 ***
any_treatment     0.451      0.427    1.06   0.29411
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
RMSE: 1.85732   Adj. R2: 0.001368
```

Conditional Average Treatment Effect

```
m_ate <- male[any_treatment == 1, mean(score)] - male[any_treatment == 0, mean(score)]
```

```
t.test(male[any_treatment==1, score], male[any_treatment==0, score])
```

```
[1] 1.17


        Welch Two Sample t-test

data:  male[any_treatment == 1, score] and male[any_treatment == 0, score]
t = 2, df = 31, p-value = 0.06
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.0704  2.4037
sample estimates:
mean of x mean of y
     4.61      3.44
```

Conditional Average Treatment Effect

```
f_ate <- female[any_treatment == 1, mean(score)] - female[any_treatment == 0, mean(score)]
```

```
t.test(female[any_treatment==1, score], female[any_treatment==0, score])
```

```
[1] -0.162

        Welch Two Sample t-test

data:  female[any_treatment == 1, score] and female[any_treatment == 0, score]
t = -0.3, df = 33, p-value = 0.8
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.33  1.01
sample estimates:
mean of x mean of y
     3.24      3.40
```

Control Covariate in Regression

cov_reg <- feols(score ~ any_treatment + gender, data=data, se='white')

```
> summary(cov_reg)
OLS estimation, Dep. Var.: score
Observations: 77
Standard-errors: Heteroskedasticity-robust
             Estimate Std. Error t value  Pr(>|t|)
(Intercept)     3.798      0.339   11.22 < 2.2e-16 ***
any_treatment   0.459      0.421    1.09   0.27904
gender         -0.716      0.424   -1.69   0.09511 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
RMSE: 1.82261   Adj. R2: 0.025344
```

Estimate: 0.451 → 0.459
Standard Error: 0.427 → 0.421

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RANDOMIZATION CHECK

Randomization Check Part 1

regression_pre_effects_gender <- feols(gender ~ any_treatment, data = data)

	Estimate <dbl>	Std. Error <dbl>	t value <dbl>	Pr(>|t|) <chr>	<fctr>
(Intercept)	0.5263	0.082	6.418	1.1199e-08	***
any_treatment	0.0121	0.115	0.105	9.1633e-01	

2 rows

- Gender is a control variable that is not affected by treatment
- The estimate of any_treatment is not significant
- It proves that no substantial differences in before experiment variables

Randomization Check Part 2

- P-value =1 >0.05 ---> can't reject the null
- The randomization proportion was done properly

Prop.test (num_obs_treat, num_obs_all, p = proportion_treatment)

```
        1-sample proportions test with continuity correction

data:  num_obs_treat out of num_obs_all, null probability proportion_treatment
X-squared = 0, df = 1, p-value = 1
alternative hypothesis: true p is not equal to 0.5
95 percent confidence interval:
 0.391 0.621
sample estimates:
    p
0.506
```

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STATISTICAL POWER

Statistical Power

- The Cohen's D of 0.239 -> small effect
- The power of 0.179 -> less likely to detect the effect

```
t test power calculation

        n1 = 39
        n2 = 38
         d = 0.239
 sig.level = 0.05
     power = 0.179
alternative = two.sided
```

pwr.t2n.test(n1 = num_obs_treat, n2 = num_control, d = cohens_d, sig.level = .05, power = NULL)

Statistical Power

need 275 observations in total

↓

higher power of 0.8

```
     Two-sample t test power calculation

              n = 275
              d = 0.239
      sig.level = 0.05
          power = 0.8
    alternative = two.sided

NOTE: n is number in *each* group
```

Pwr.t.test (n = NULL, d = cohens_d, sig.level = .05, power = 0.8)

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CONCLUSION & LIMITATION

Conclusion

- Analyzed effect of brand names on clothing preferences
- Positive effect overall but not significant
- Men had higher ATE than women - more likely to choose high-end products.
- Experiment was done properly based on randomization check
- Need 275 observations to reach power of 0.8

Limitations

- Adding more product variety in the same product category
- Expanding age range of respondents
- Adding more brands - include mid-luxury brands

Thank you!