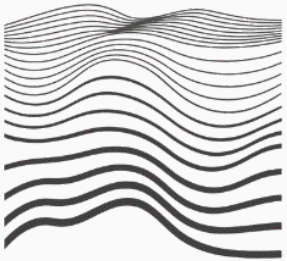
# Small Sample Test

*project by:*



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# Summary

# Background

***Sweet Treats*** *is a (hypothetical) national chain selling frozen desserts. They want to run an A/B test on the landing page from which customers click through to start an online order*

# Hypothesis

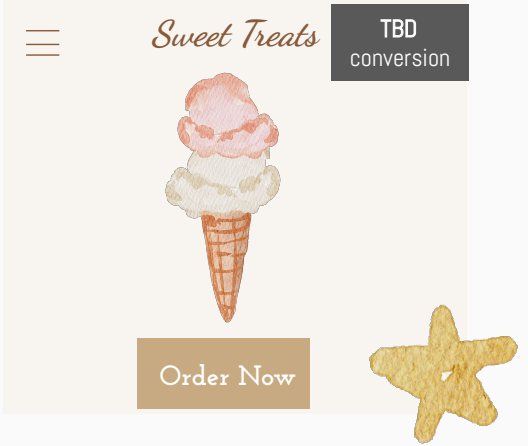
**The treatment landing page performs better than the control**

*(with significance at 5% level)*

control


Popsicles were previously the top product, but with shifts in taste, its interest is declining. Conversion is also currently on the **lower end of industry benchmarks** (2%-6.5%)

treatment




I **hypothesize improvement** with the treatment, as it features **ice cream** , which is the store's **new top product**

# Test Design

**Significance level:** 5%
**Power:** 80%
**Baseline conversion rate:** 2%
**Sample Needed:** 8,000

## Constraints

The **test was unexpectedly cut short:**

*The landing page needs to be switched over sooner due to the orange popsicle product running out indefinitely due to a supply chain issue. There is interest in urgently switching to the treatment, as it features a current product. The results give as much information as I will get about how the treatment performed*

## Sample Size

The initial sample size of 8,000 users was **reduced to 890 users**

# *Methodology*

## Statistical Test

I need to use **Fisher's Exact Test for small sample sizes**
which is used when a cell has < 10 users:

Users in cell:
**< 10**

| | Converted | Not_Converted |
|---|---|---|
| Control | 9 | 450 |
| Treatment | 20 | 440 |

# *Results*

Test confirms **treatment > control**

| | Converted | Not_Converted |
|---|---|---|
| Treatment | 20 | 440 |
| Control | 9 | 450 |

p1: Treatment Conversion Rate: 4.35%
p2: Control Conversion Rate: 1.96%

95 percent confidence interval:
1.098979 Inf

**Observed treatment conversion rate is:**

**~2.2x** higher vs. control

**True treatment odds lift:**

**>=9.9%** higher vs. control

**95% Confident**

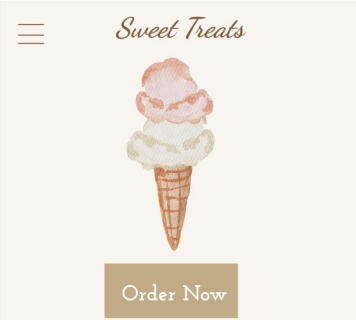
P-value: (0.029) (< 0.05) ✓ Result is **statistically significant (5% level)**

"Result Power: 60.6 %" ✗ **However,** the test was somewhat **underpowered** due to low volumes (<80%)

# Recommendation

*In this case, given the constraint of wanting to feature current products...*I am comfortable enough with the **treatment performing some level higher with significance** than the control and not vice versa.

**I recommend moving forward with implementing the treatment page:**




**But I will not provide Revenue Impact:**

Due to the test not hitting its sample size, or achieving its desired statistical power, the **lift** cannot be confidently/safely used **in this scenario** to build a revenue projection.

*notebook link:*


**Tools:** R in Google Colab
**Data Source:** Self-generated

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