

Fast Food Marketing Campaign A/B Test

Goal

Business Context:

A fast-food chain wants to launch a new menu item but is unsure which of three marketing campaigns will drive the most sales. To find out, the company tested each campaign in randomly selected markets.

Test Objective:

Evaluate the performance of each promotion using sales data, and decide which campaign is most effective at increasing revenue.

For analysis of A/B test results we will use a **confidence level of 99%**.

Target Metric

The primary target metric is **average sales revenue per store**.

Why this metric?

Because it directly reflects how effective each campaign is in driving revenue.

Calculations

The table contains the numbers necessary to analyze the A/B test and reach a decision. You can find the query in the appendix.

marketing campaign #	total stores	avg sales (\$K)	stddev
1	43	232.396	64.113
2	47	189.318	57.988
3	47	221.458	65.535

Table 1. Summary of the results of the fast food marketing campaign A/B test.

Insights:

- **Campaign 1** achieved the highest **average weekly sales**, indicating the strongest performance.
- **Campaign 2** had the **lowest sales**, suggesting it was the least effective.
- **Campaign 3** performed moderately well but did not outperform Campaign 1.

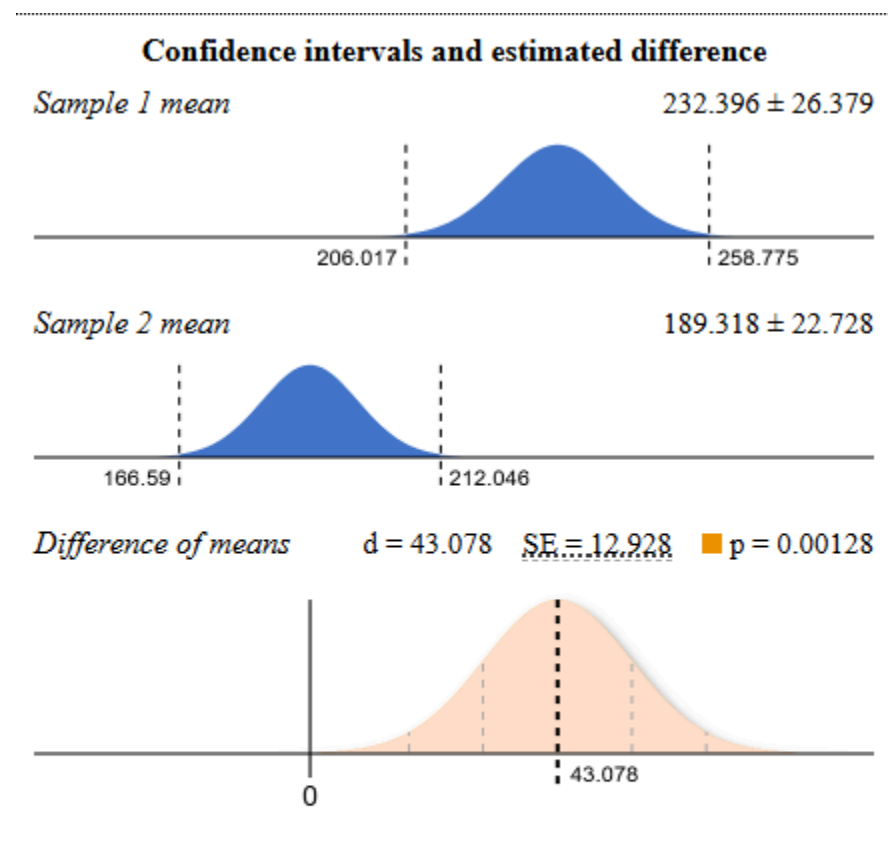
Based on the data, **Campaign 1** is the most promising strategy for promoting the new product.

Statistical Testing:

To confirm if the differences are statistically significant, I applied a T-Test via the Evan Miller A/B test calculator, comparing all three campaigns at a 99% confidence level.

Null hypothesis (H_0): There is no statistically significant difference in total sales between Campaign 1 and Campaign 2 (total sales #1 = total sales #2).

Alternative hypothesis (H_1): There is a statistically significant difference in total sales between Campaign 1 and Campaign 2 (total sales #1 \neq total sales #2).



Verdict: Sample 1 mean is greater

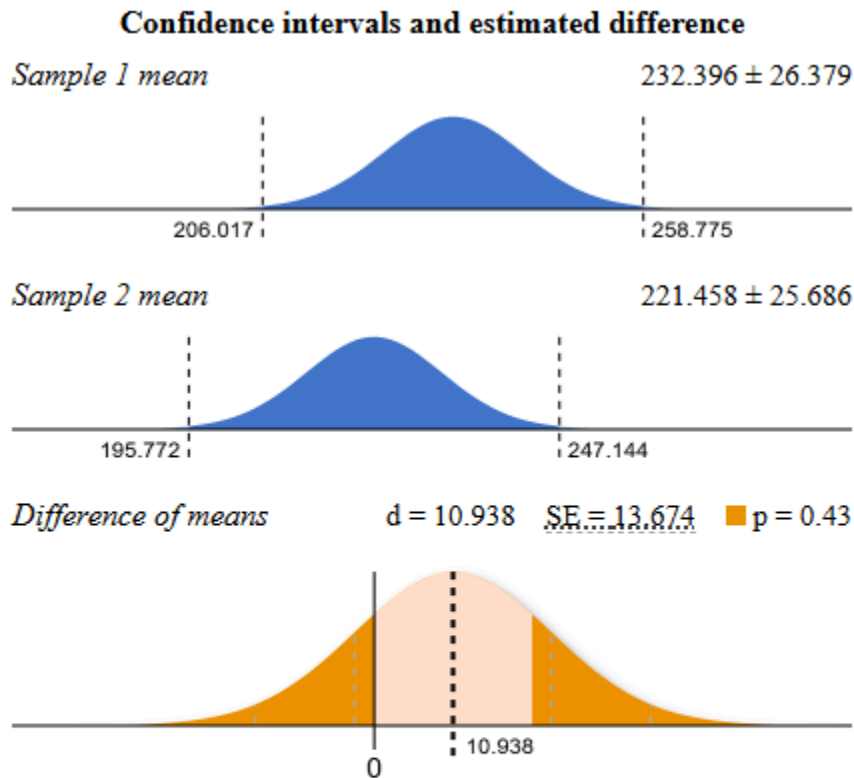
Hypothesis: ☒ $d = 0$ ☐ $d \leq 0$ ☐ $d \geq 0$

Confidence: 99%

H_0 rejected ($p = 0.00128$): significant difference in revenue.

Null hypothesis (H_0): There is no statistically significant difference in total sales between Campaign 1 and Campaign 3 (total sales #1 = total sales #3).

Alternative hypothesis (H_1): There is a statistically significant difference in total sales between Campaign 1 and Campaign 3 (total sales #1 \neq total sales #3).



Verdict: No significant difference

Hypothesis: ☒ $d = 0$ ☐ $d \leq 0$ ☐ $d \geq 0$

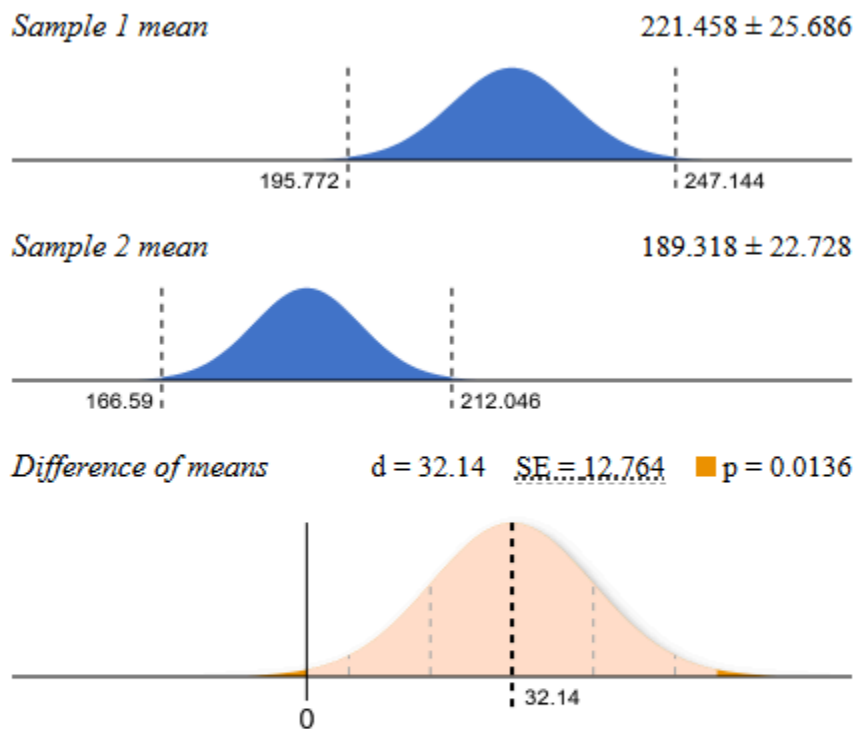
Confidence:

H_0 not rejected ($p = 0.43$): no significant difference.

Null hypothesis (H_0): There is no statistically significant difference in total sales between Campaign 3 and Campaign 2 (total sales #3 = total sales #2).

Alternative hypothesis (H_1): There is a statistically significant difference in total sales between Campaign 3 and Campaign 2 (total sales #3 \neq total sales #2).

Confidence intervals and estimated difference



Verdict: No significant difference

Hypothesis: ☒ $d = 0$ ☐ $d \leq 0$ ☐ $d \geq 0$

Confidence:

H_0 not rejected ($p = 0.0136$): no significant difference.

Decision

Based on the statistical analysis with a 99% confidence level:

- **Campaign 2** is clearly the least effective and should be discontinued.
- **Campaigns 1 and 3** both perform well, with no statistically significant difference between them.
- Since **Campaign 1 has the highest average sales**, it is the preferred option.
- However, if **Campaign 3 is cheaper to implement than Campaign 1**, it may be more cost-effective to select **Campaign 3**, balancing sales performance and cost.

Appendix

Query for Table 1

```
with data_set as (  
  select  
    location_id,  
    promotion,  
    sum(sales_in_thousands) as total_revenue  
  from  
    tc-da-1.turing_data_analytics.wa_marketing_campaign  
  group by  
    location_id, promotion  
)  
select  
  promotion as marketing_campaign,  
  count (*) as total_stores,  
  round(AVG(total_revenue),3) AS mean_sales,  
  round(STDDEV(total_revenue),3) AS stddev_sales  
from  
  data_set  
group by
```

promotion