January - March 2022

McDonald's Footfall Measurement

UVertz

mira™
A Reveal Mobile Company

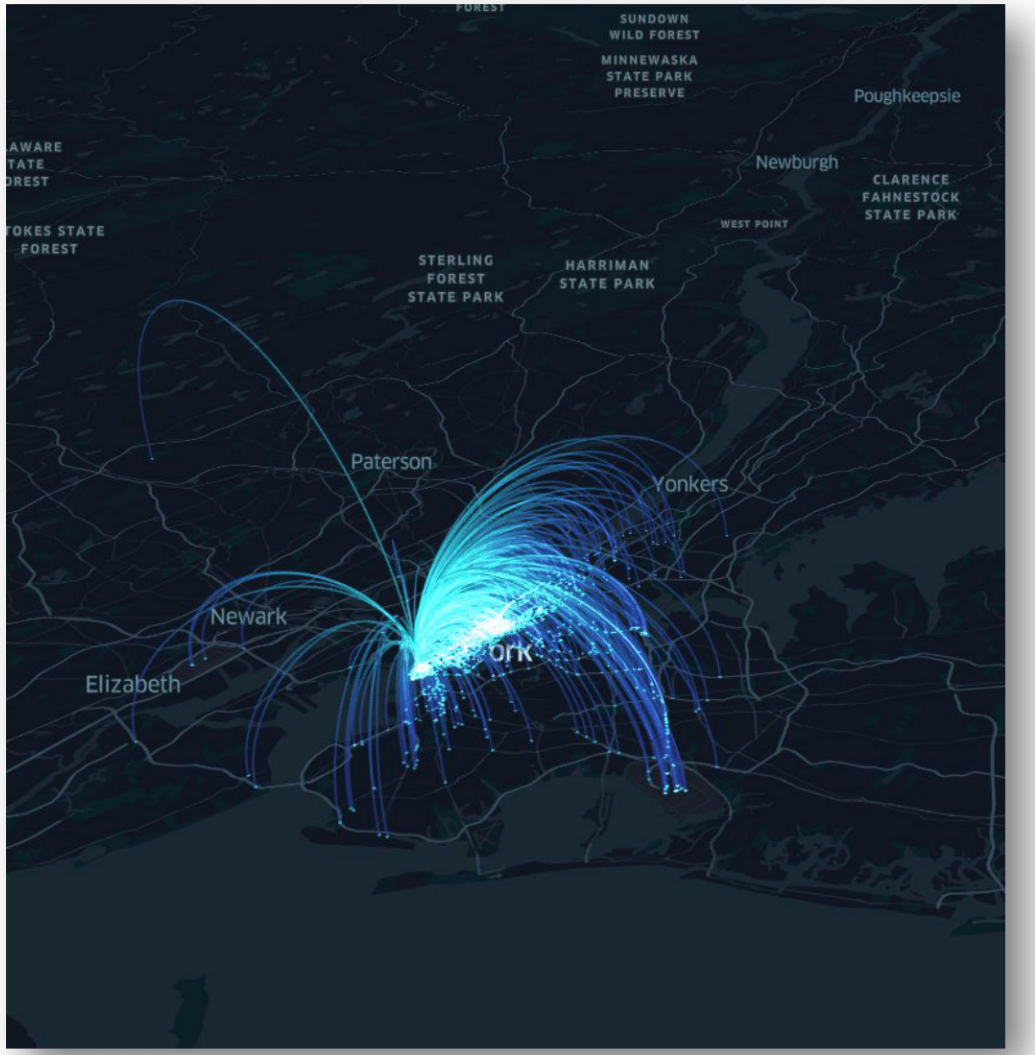
Solution

Mira is

- Location Intelligence
- Built for the OOH channel
- Applications in planning, real-time optimization, and **attribution**

Data

- Opted-In Mobile Location Data
  - Advertising ID, Time, Lat/Lon
- 9B+ Events / Day
- 45M DAU
- Persistent; non-bidstream
- Universe mirrors national distribution
  - No demographic bias
- All keyed by mobile advertising ID
  - Resettable
  - Can be deactivated
  - Respects OS privacy settings



Exposures & Geofences

- Draw geofence around signage and waypoints
  - Take into account direction/facing
  - Radius scales with traffic and visibility
- Overlay with location data
- Filter for unit flight dates
  - End up with all events near signage during campaign
- For digital OOH, filter based on ad roll time

- A user is said to be exposed if they had the opportunity to view media.

  ✓ In geofence
  ✓ During flight dates
  ✓ During ad roll (if applicable)
  ✓ Traveling in appropriate direction

Control Construction

- Not sufficient to only consider exposed consumers (test group)
  - Test group could innately be more inclined to take an action or react to media
- In a perfect world, control is identical to test in every way, but wasn't exposed
- Instead, we observe the test group ***first*** and construct the control to match:
  - **Demographics -** using Neustar ElementOne
    - Same distribution of household income, age, urbanicity, marital status, homeownership, CoL
  - **Geography** - using Mira
    - Same geographic distribution of home locations and overall movements
  - **Fidelity** - using Mira
    - Control users provide the same fidelity of data as exposed users

Methodology

Experiment Structure

Measure

We ingest a description of where and when ads were visible. For digital and moving OOH, we ingest play logs and waypoints.

Overlay this with historical location data to determine who was exposed to the campaign.

These mobile IDs become the exposed / test group.

Control

Construct a control group that mirrors the test group across as many variables as possible, except they were never exposed to the campaign.

Quantify

Intersect these groups with visitation data to observe the different behavior over time.

Compare control and test to each other before and after the campaign began.

Pre & Post Periods

Split experiment into pre-campaign and post-campaign.

Why?

- To observe how each group evolves over time
  - Obtain baseline statistics before media starts (pre)
  - Compare to after campaign begins (post)

- Control for seasonality and temporal effects
  - e.g., people more likely to visit store closer to holidays
  - Will be reflected in both control and test, can isolate effects

	Pre	**Post**
Control	Pre Control	Post Control
Test (Exposed)	Pre Test	Post Test

Table 1: We make 4 observations for each trial

Metrics Definitions

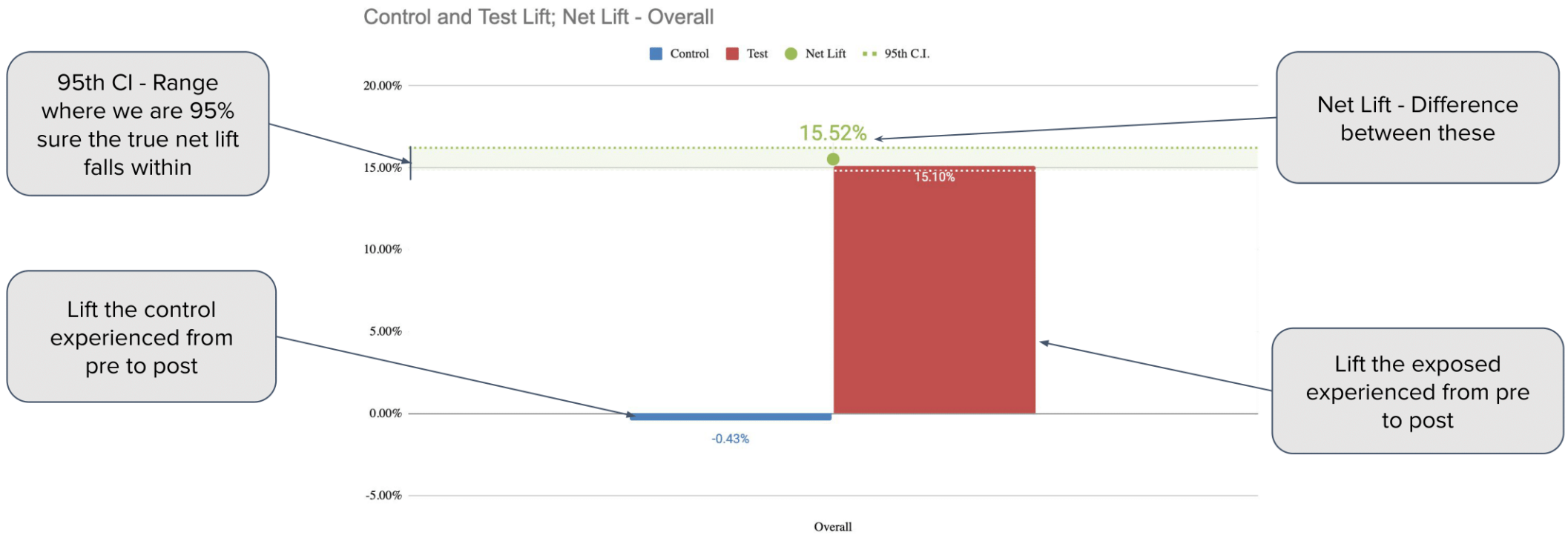
- **Conversion -** unique user takes a particular action
- **Conversion Rate** - conversion / total number of users for that group
- **Lift** - percent change, e.g., the lift from A to B is (B / A) - 1
- **Post Lift** - lift from post control to post test
- **Control Lift** - lift from pre control to post control
- **Test Lift** - lift from pre test to post test
- **Net Lift** - difference from control lift to test lift

Hypothesis

Consumers exposed to OOH media...

- Experience a lift in conversion rate from pre to post that is larger than the lift the control experiences over the same time period.
  - Net lift is positive

Reading Net Lift Charts



Note that when the 95th CI range is fully above or below 0 then that result is significant*. In this case, there is no ambiguity about where the true result is positive or negative.

**This isn't always true, but in the vast majority of cases it is.*

Results

Quick Numbers

Exposed Sample Size: 283,334

Control Sample Size: 227,390

Why not more?

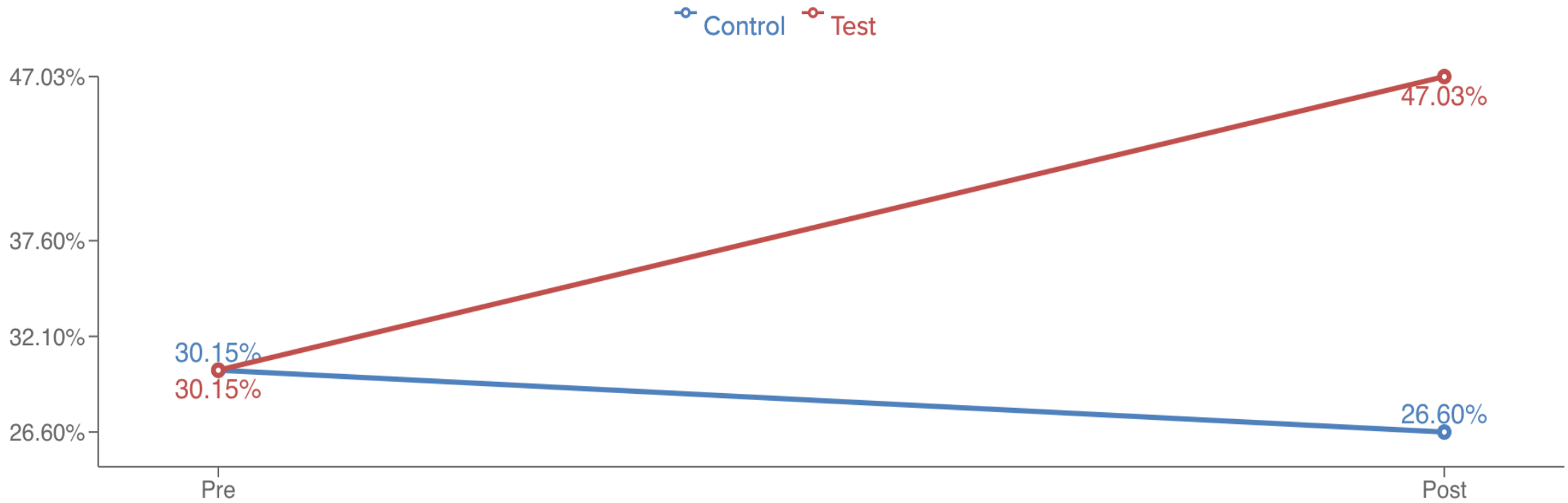
We are often asked why this number is not commensurate with OOH impression numbers.

- Our data is a sample of total population
- Our sample rate: ~5-10%
- Impressions are not unique
- Sample size is how many unique users were exposed

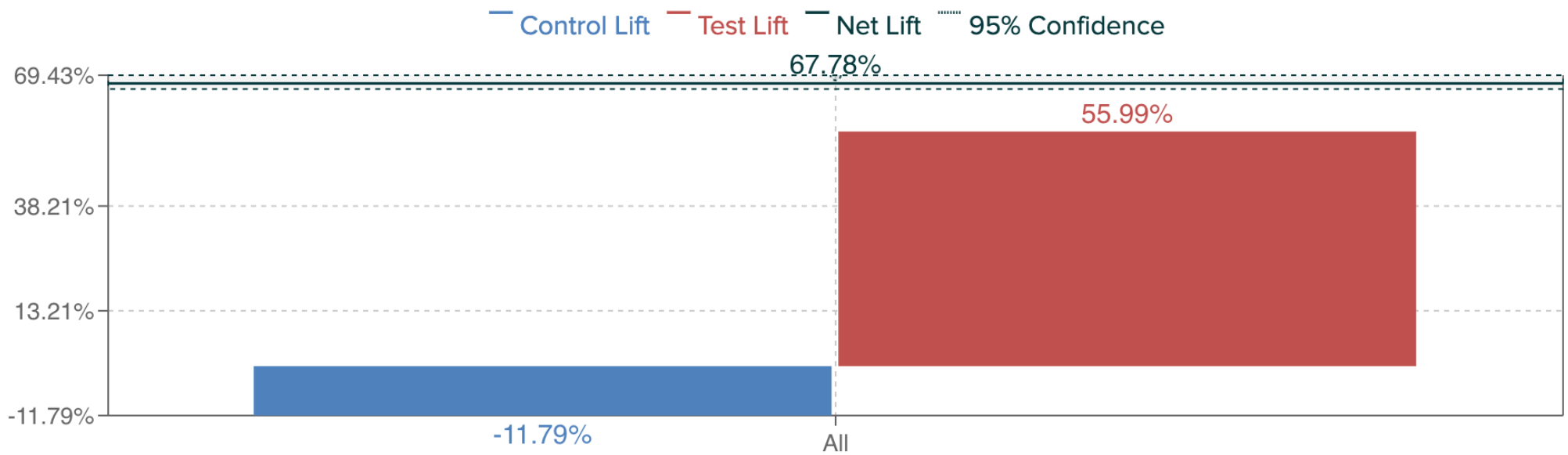
Other Numbers

- 14 day conversion window
  - The test group has 14 days to convert after being exposed
  - Conversion only counted if it occurs after exposure
- Pre Period
  - December 18, 2021 - December 31, 2021
  - Note we only need 14 days (conversion window)
- Post Period
  - January 1, 2022 - March 31, 2022

Control vs. Test; Pre vs. Post Conversion Rates - Overall

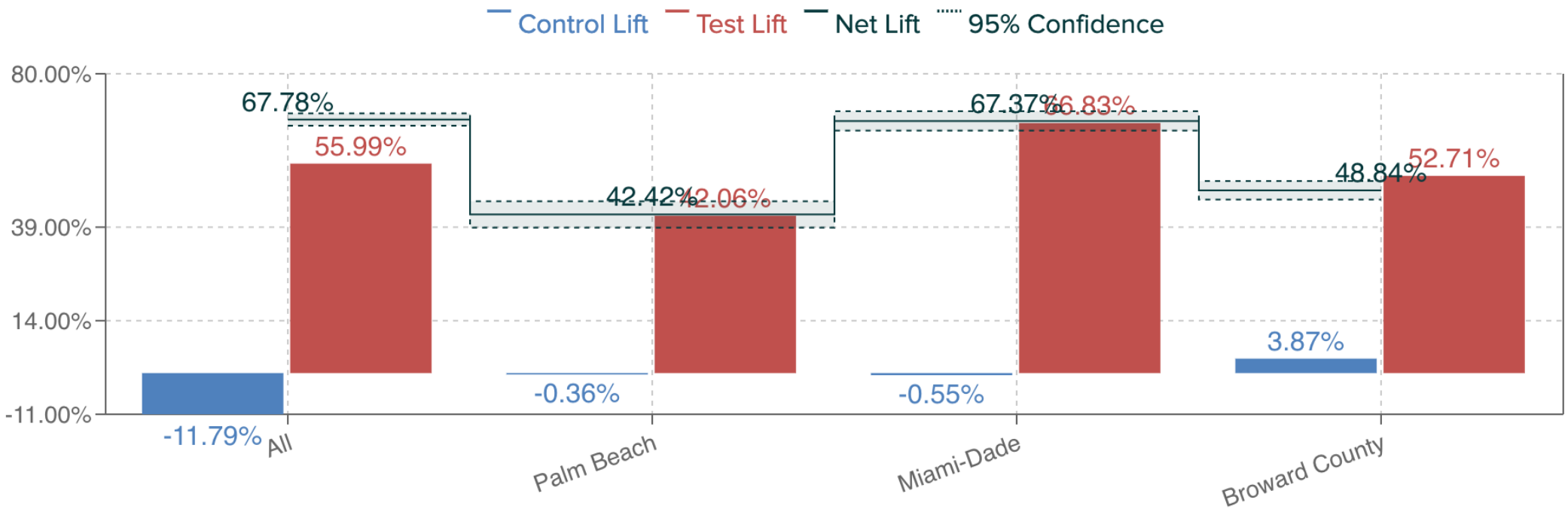


Control and Test Lift; Net Lift - Overall



We observe a positive, statistically significant net lift for the campaign as a whole! Notice the downward trend of the control group from pre - post. We'd expect the test group to perform similarly without the UVertz OOH campaign. Exposed users are 68% more likely to visit a McDonald's location than unexposed users.

Control and Test Lift; Net Lift vs County



The result holds across all counties! Miami-Dade has the highest net lift at 67%. Test Lift %'s: Palm Beach: 42.06% Miami-Dade: 66.83% Broward : 52.71%

Appendix

Basics of Statistical Tests

- Define null hypothesis. For example:
  - Null Hypothesis: Control and exposed users true conversion rate is equal.
  - Alt Hypothesis: Exposed users have a higher true conversion rate than control users.
- Collect sample data from each population
- Consider assumptions made in the comparison (e.g. how many samples, independence, matchedness, continuous/dichotomous)
- Select a test statistic appropriate for these assumptions
  - Derive distribution of test stat, e.g. Normal Distribution or Student's t
  - See appendix for test statistics
- Compute the **observed** test statistic
- Compute probability of obtaining the observed test statistic under the null hypothesis
  - We derived the distribution of the test stat under the null hypothesis, so we use the CDF of that distribution to find this.
  - This is the *p-value*

The p-value is the probability that the null hypothesis is true given the observed test statistic. For this report, we reject the null hypothesis if the p-value is under 0.05 or 5%.

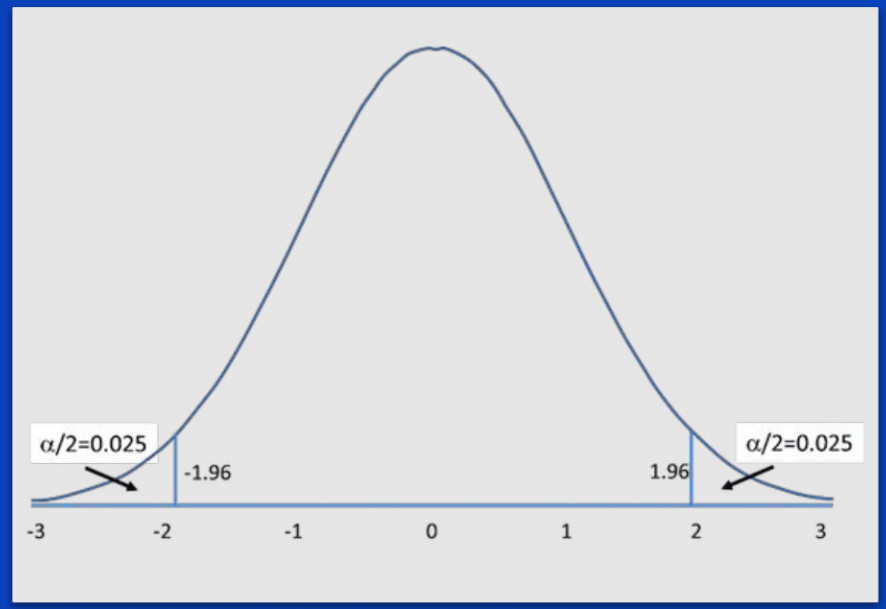
Test Statistics

Each computation of significance in general uses a different test statistic.

Which test statistic to use is dictated by statistical assumptions made about the populations and properties of the experiment.

If our test statistic is distributed as standard normal, its pdf looks like the below.

The area under the two regions is a total of α, here 5%. We reject the null hypothesis when our test statistic falls in one of these regions.



Confidence Levels and Intervals

- A result is said to be significant if there is less than a 5% probability the result could be due to chance
  - More precisely, if there is less than a 5% probability that we reject the null hypothesis even though it is true (Type I Error)
  - This 5% is chosen as a convention or metric by which you evaluate all results in the experiment
  - Corresponds to a 95% confidence level. This is a fixed value.
- When a result is reported, it was a significant result
  - The observed metrics place it at above a 95% confidence level
  - We reject that it was due to chance (the null hypothesis)
- This is not the same as confidence intervals
  - A 95% confidence interval is the range of values you are 95% sure the true value falls in between
  - Varies from result to result, not fixed for entire experiment
  - For the most part, if a confidence interval is entirely above or below zero, we have achieved significance (in a two-tailed test)

mira
A Reveal Mobile Company

Contact Us

support@revealmobile.com