# Online Advertising Incrementality Testing And Experimentation

## Industry Practical Lessons

**Joel Barajas**, Narayan Bhamidipati, James G. Shanahan

August 14th, 2021

KDD2021

# Tutorial Pats

1. **The basics: context and challenges**

2. **Incrementality Testing: concepts, solutions and literature**

3. **From concept to production: platform building, challenges, case studies**

4. **Deployment at Scale: test cycle and case studies**

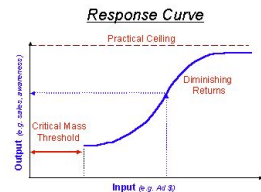5. **Emerging trends: identity challenges, industry trends and solutions**

# Part 1

# The basics: context and challenges

# Context: Business Need
*Kireyev et al. (2016), Li and Kannan (2014)*



Response Curve

## Why we need to run incrementality tests

1.  Measure channel spend effectiveness for **optimal budget allocation** and planning.
    - *Channels* are often **marketing specific media**, eg social, paid search, programmatic display, TV, radio, etc

2.  Calibrate **Media Mix Models** to estimate the channel response curve at different spend levels
    - *Media Mix Models* are often **financial time-series based models** that predict aggregate marketing spend performance in yearly/quarterly planning

**verizon✓ media**

# Context: Business Need
*Kireyev et al. (2016), Li and Kannan (2014)*

## As a result, tests are often run at channel aggregate level

1. Channel level requires **all advertiser spend** aggregated over weeks (even months) of testing
   - Results often inform quarter budget allocations with a measure of lift and efficiency, eg **cost per incremental conversion (CPIA)**

2. **CPIA** provides a **reliable comparison with other channels** regardless of the channel in the funnel
   - A standard challenge with spend planning based on last-touch attribution is the **highly imbalanced conversion rates between demand-capture and demand generation channels**

# Context: Business Demand for Testing
*Gordon et al. (2019)*

**Why testing when we have numerous causal inference frameworks?**

1.  Because observational studies without deliberate interventions often **greatly overestimate** the value of online ads
    - Even in the **presence of rich confounding features, *Gordon et al* could not replicate experiment** results in a large number of tests and with multiple causal inference techniques


2.  Running **randomized controlled experiments** is the gold standard in marketing incrementality measurement.
    - A widely accepted notion in the online advertising industry

Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

6

# Context: Business Use Cases
*Barajas and Bhamidipati (2021)*

## Typical use cases for online advertising vendors

- **New advertiser** wants to *test waters* before fully deploying budgets
    - Generating trust, a successful test leads to **incremental revenue** for the ad network


- Existing advertiser wants to **scientifically prove incremental value**
    - Regular incrementality tests to **assess the strategy**, from advertiser's conversion metric definitions to provide certainty of the current budgets

**verizon**√
**media**

# Context: Business Use Cases
*Barajas and Bhamidipati (2021)*

**Typical use cases for online advertising vendors**

- Incrementality of **tactical practices** with external validity for future deployment
  - Examples include: **CRM vs new customers, prospective vs remarketing**, etc

- Quarterly regular **strategic adjustments** (retrospectively)
  - From test insights, **targeting and optimization recommendations** to improve incremental value

**verizon**✓
**media**

# Testing in a Nutshell

## Why incrementality testing is hard?

Verizon confidential and proprietary. Unauthorized disclosure, reproduction or other use prohibited.

9

# Incrementality Testing in a Nutshell

**Goal:**

Find Aggregate Effect of Marketing Spend

**Randomized unit:**
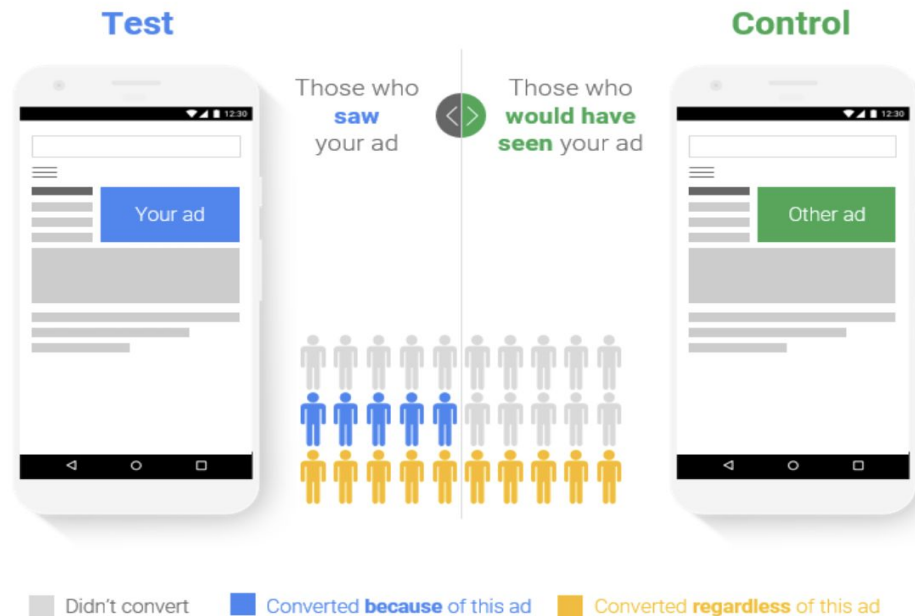
Users (our best notion)

**Intervention:**

Marketing Spend leading to ad delivery

**Control:**

No marketing ads

**Metrics:**

Converter Lifts, Cost per incremental converter/conversions, among others



**Test**

**Control**

Those who **saw** your ad

Those who **would have seen** your ad

Your ad

Other ad

Didn't convert    Converted **because** of this ad    Converted **regardless** of this ad

# If this is *just* an A/B test, why we need more?

# We'll review in next part of the tutorial….