Class 13 Case Study: Improve User Engagement for Instagram Using A/B/N Testing

Dr. Wei Miao

UCL School of Management

November 11, 2026

Section 1

Case Background

Business Objective

- Instagram aims to increase user engagement and activity.
- We can propose **gamification** strategies based on scientific theories.
- Need to empirically test whether proposed gamification strategies are effective using A/B/N tests.

Section 2

Theoretical Motivations

Theoretical Motivation for Business Ideas

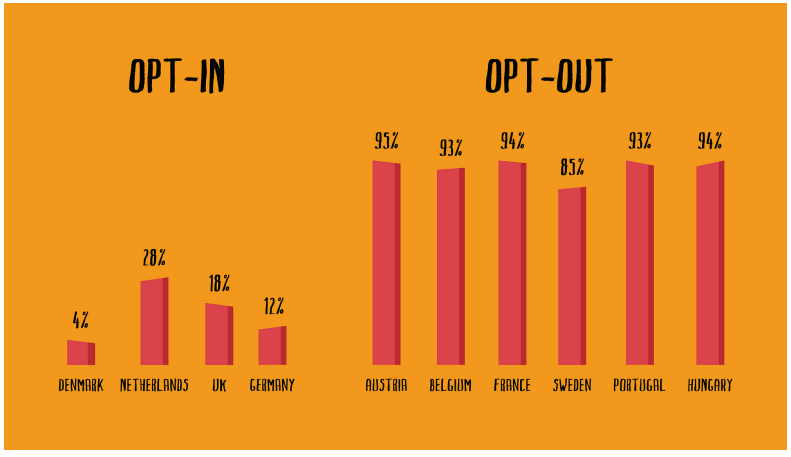
- When proposing business ideas, we should base our proposals on scientific, well-established theories from different disciplines.
  - **Bottom-up approach**: start with established theories and then generate business ideas
  - **Top-down approach**: start with business ideas and then find theories to support and explain them for generalisability
- Let's first see some examples of behavioural economics theories!

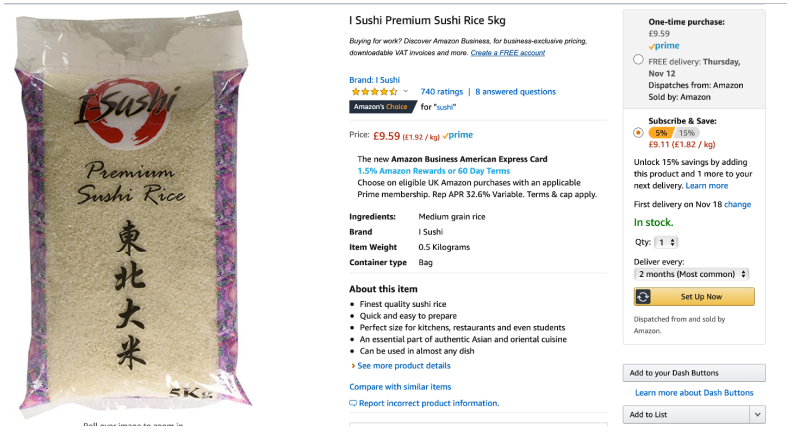
Behavioural Theories

- Framing effect
- Endowment effect
- Mental accounting

Default Effect

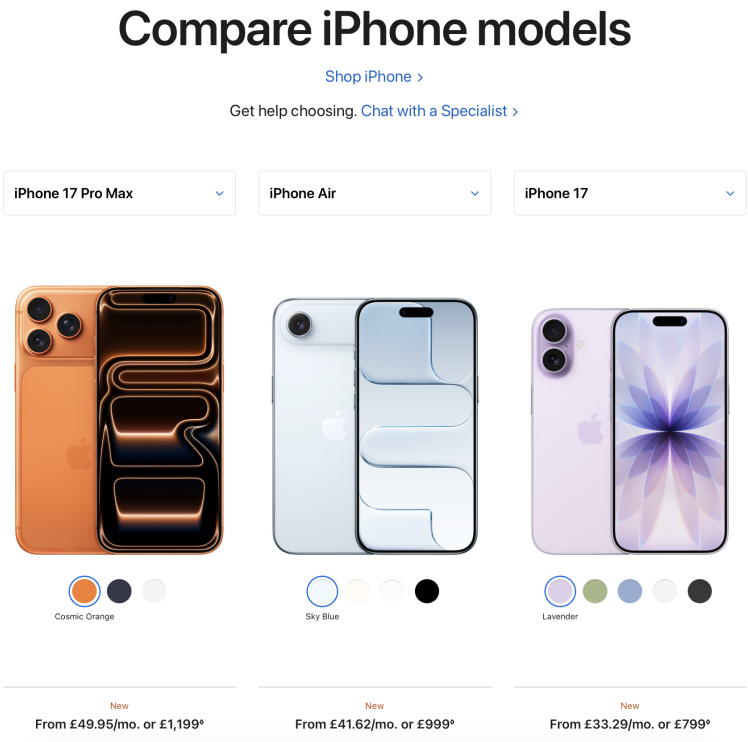
- Default effect





Left-Digit Bias

- Left-digit bias



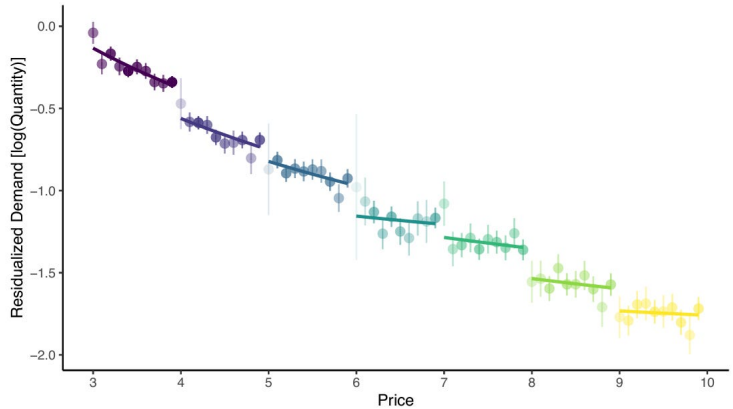
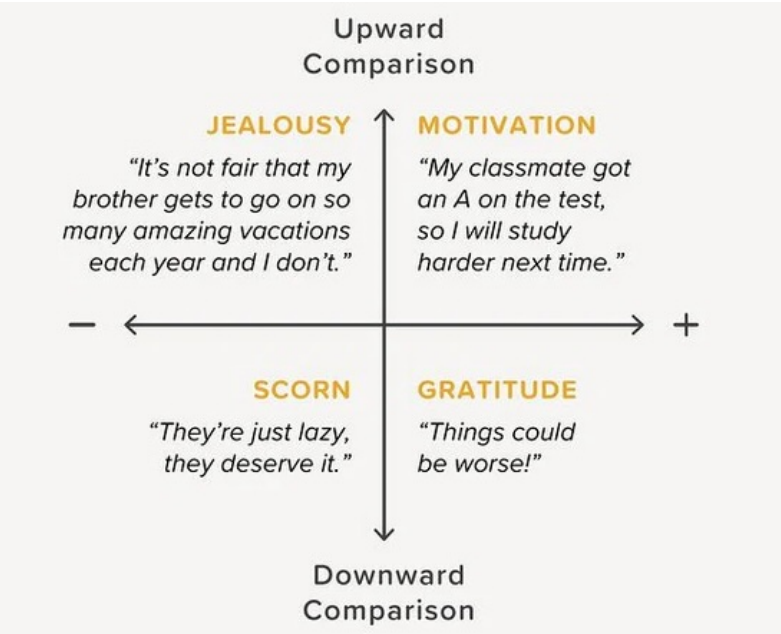


FIGURE 2
Demand curve of thirty-seven products, exhibiting drops at dollar digits

Notes: The figure shows a non-parametric demand curve. Data are for thirty-seven unique products with similar elasticities (between −1.35 and −1.65) from the module "ground and whole bean coffee". Each dot is the estimand from regressing log-quantity sold on a ten-cent dummy (*e.g.*, $4.90–$4.99), controlling for prices of competing products, and fixed-effects which are the interactions between UPC-chain and store, month-of-year, week-of-month, last digit, and promotional flags. Standard errors are clustered at the store level, and opaqueness in the figure is inverse to standard errors.

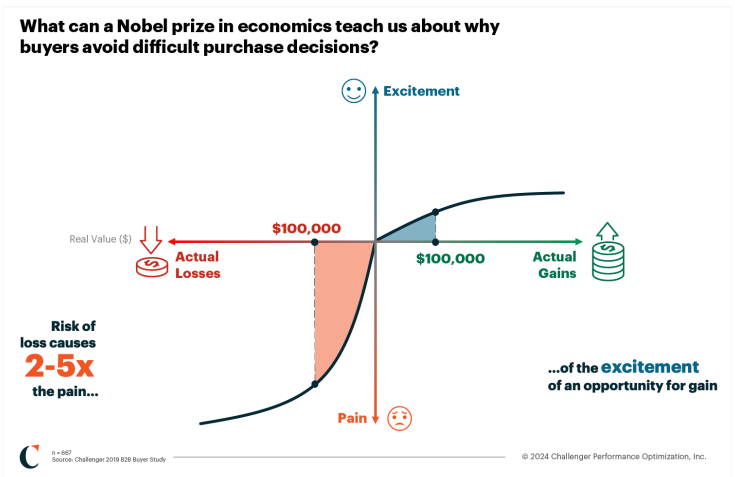
Social Comparison Theory

- People evaluate their own opinions and abilities by comparing themselves to others, especially when comparing oneself to similar others.
- Social comparison can be upward or downward.
- Social comparison can motivate people to improve their performance; however, it can also lead to negative emotions.



Prospect Theory

- Prospect theory posits that people feel more pain from losing something than pleasure from gaining something.
- This theory can be used to explain why people are more likely to engage in activities that prevent loss than those that promote gain.



Business Proposal

- Implement gamification features on Instagram to increase user activity based primarily on Social Comparison Theory.
- Generate ideas that can sustainably boost user engagement while safeguarding user well-being.

Potential Strategies

- **Endowment effect**: Implement a points and badge system to create a sense of ownership and encourage engagement (e.g. likes, comments, shares).
- **Social comparison theory**: Leaderboards showing top users; activity rankings and comparative progress panels.
- Any other ideas?

Section 3

A/B/N Testing for Instagram

Step 1: Decide on the Unit of Randomisation

- What would be the best unit of randomisation?
- What are the potential problems for spillover and crossover?

Tip

For solutions to this case study, please check the website version of the case study here

Step 2: Decide on Randomisation Allocation Scheme

- How should we determine the randomisation scheme?

Step 3: Decide on Sample Selection and Treatment Duration

- What is the sample size we need?

Step 4: Collect Data

- What data should we collect?

Step 5: Interpreting Results from a Field Experiment

- **Randomisation check**: Verify treatment and control groups are well balanced on **pre-treatment** characteristics; adjust with regression if imbalances arise.
- **Analyse the data and estimate the ATE**: Use difference in means (A/B) or regression with treatment indicators (A/B/N) to estimate average treatment effects (ATE), adding covariates only if needed for precision or imbalance correction.

After-Class

- (optional) Test and learn: How a culture of experimentation can help grow your business