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All Roads Lead to Rome: Churn Analysis Applying Methods from Different Domains in “Naraka: Bladepoint”

Experience from NetEase

Zixiao Kang
Senior Data Analyst @ ThunderFire UX, NetEase

ThunderFire Studio, NetEase

THUNDER FIRE
STUDIO

3

Major Game Series

10+

Online Products



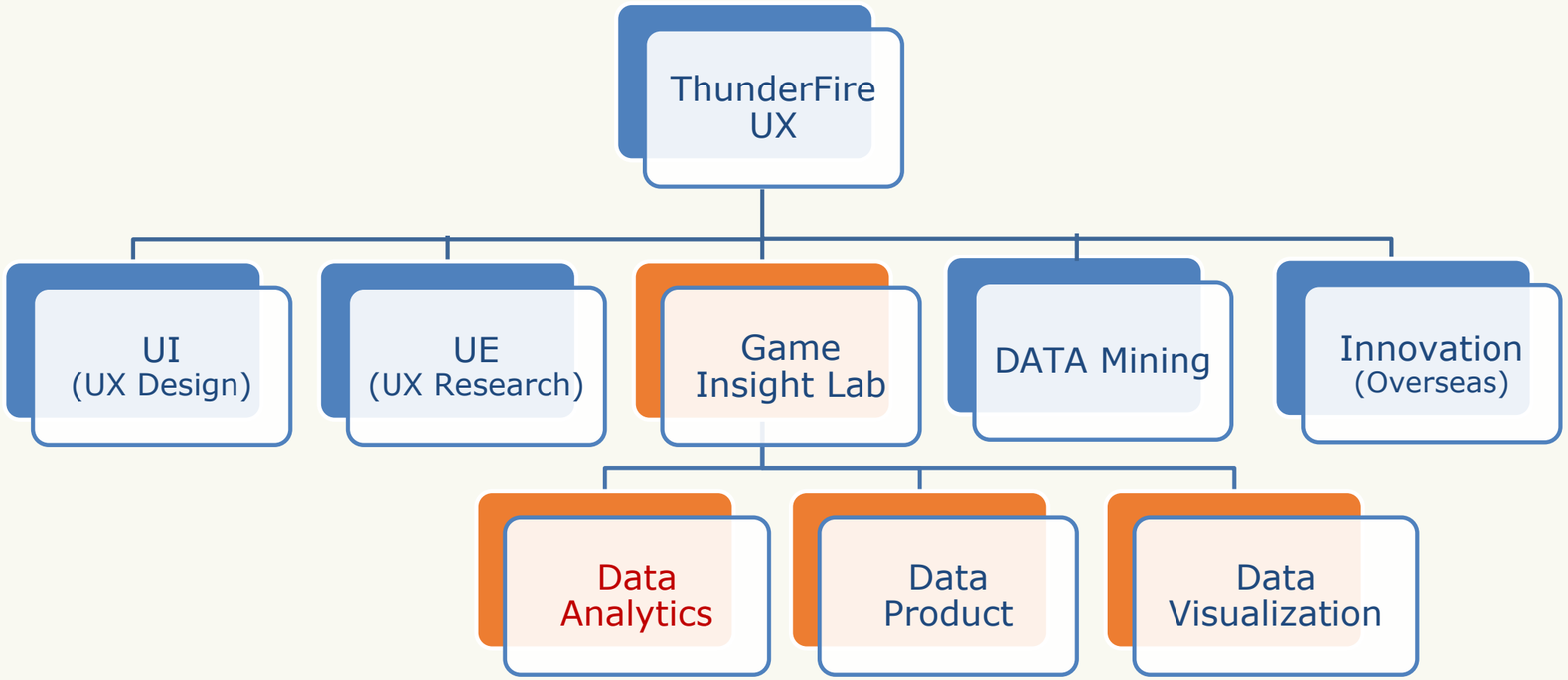
Series


PC


Mobile

ThunderFire UX (Leihuo UX)

ThunderFire UX aims at becoming the first-class user experience team in the gaming industry and is committed to helping various NetEase and ThunderFire products achieve the best user experience.



Agenda

- Naraka: Bladepoint? What’s that?
- What is churn analysis and why do we need it?
- What methods can be used in player churn analysis?
- How to apply those methods in player churn analysis?
- Takeaways

Terminology

- **Retention rate:** % of players a game retains over a period of time
- **Churn rate:** % of players a game loses over a period of time
- **Treatment group:** receives the treatment; whose effect researchers are interested in
- **Control group:** receives either no treatment, a standard treatment whose effect is already known, or a placebo (a fake treatment)
- **DAU:** Daily Active User

*Many more, but those are our focus today

Part 1:
Naraka: Bladepoint?
What’s that?

About Naraka: Bladepoint

Meet our game

- “Naraka: Bladepoint” is a Battle Royale game developed and operated by 24 Entertainment, ThunderFire.
- Released in China in July 2021; Launched on Steam in August 2021

- The main gameplay starts with 60 players landing on an island.
- Through robbing or picking up items, players avoid being killed and a poison circle, striving to survive to the end.

Part 2:
What is churn analysis and why do we need it?

Excessive Gamer Churn Really Hurts

Especially for a Battle Royale game like Naraka

- Make a negative impact on matching time
  - In a typical smooth operation period:

Low number of new players & high churn rate ⇒ Lower DAU
⇒ Longer matching time ⇒ Longer waiting time for players

- Lead the game ecosystem to a vicious cycle
  - Naraka benefits from lives and teaching videos:

Less players ⇒ Less audience/subscribers
⇒ KOL migration ⇒ Lower retention & less new players

All Retained Players are Alike, but …

Each churned player left in his/her own way

- Reasons for player churn:
  - **Systematic:** caused by players' **unsatisfied** with game content
  - **Incidental:** caused by recent **changes** in game mechanics or game balance
  - **Tendentious:** caused by people losing interest gradually *(not our main focus)*

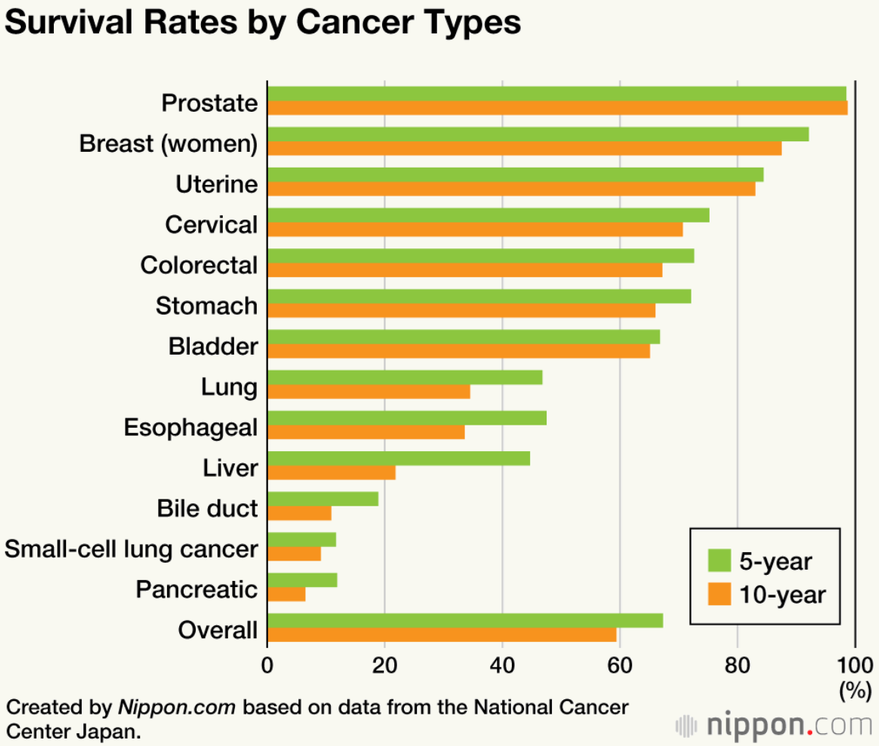
- What to do with them:
  - For systematic reasons: churn alert system
  - For incidental reasons: position and repair the bugs or modify mechanics

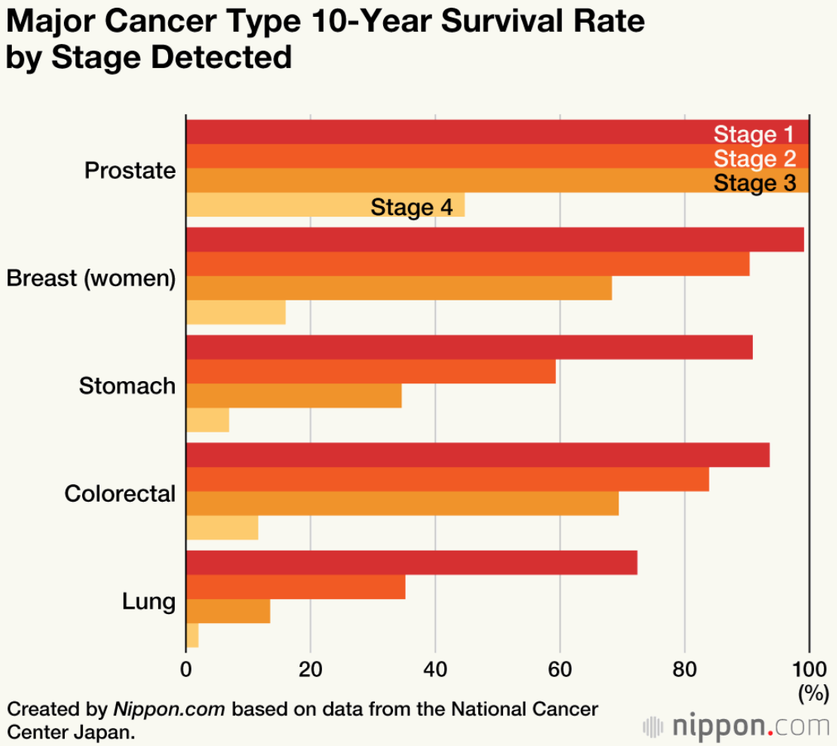
Part 3:
What methods can be used in gamer churn analysis?

Survival Analysis in Biostatistics

Assess the time to an event of interest

- Application in medical field:



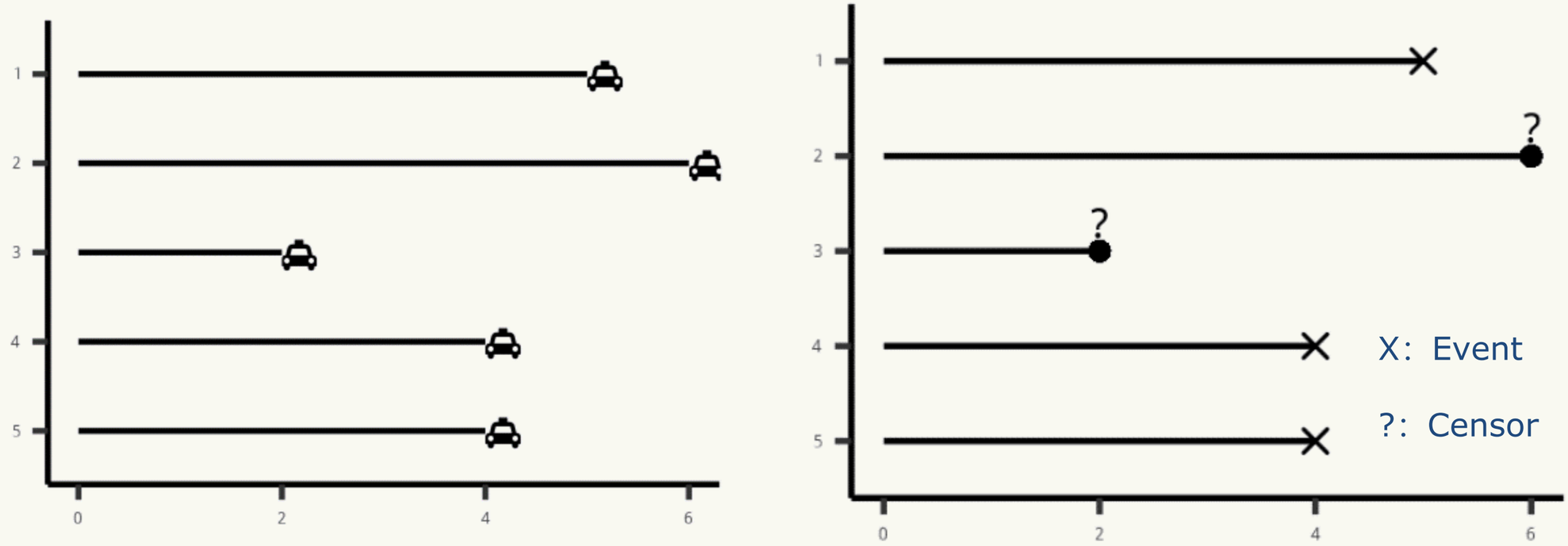


Source: Nippon.com

Survival Analysis in Biostatistics

Assess the time to an event of interest

- Basic concepts:



Source: datacamp.com

Survival Analysis in Biostatistics

Assess the time to an event of interest

- Benefits:
  - **Suitable for dealing with longitude or censored data**
    (when-player-churn)
  - **Usually generating more comprehensive results than simple binary models**
    (player churn alert system)
  - **With better interpretability than machine learning black box models**
    (advantage of traditional statistics)

Experimental Design in Epidemiology

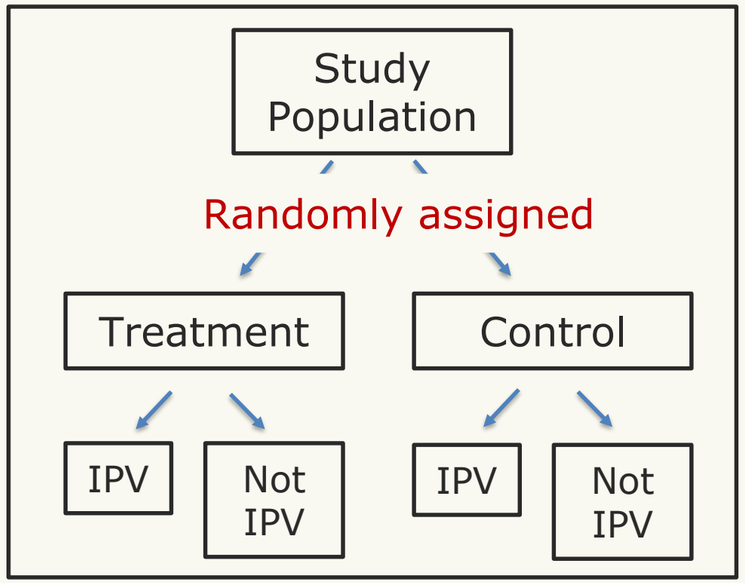
Conduct investigations to test hypothesis

- Basic concepts:
  - **How to measure risk** is the very core methodology of Epidemiology (scientific experimental design is needed)
  - Epidemiology is about how to get data from experiments

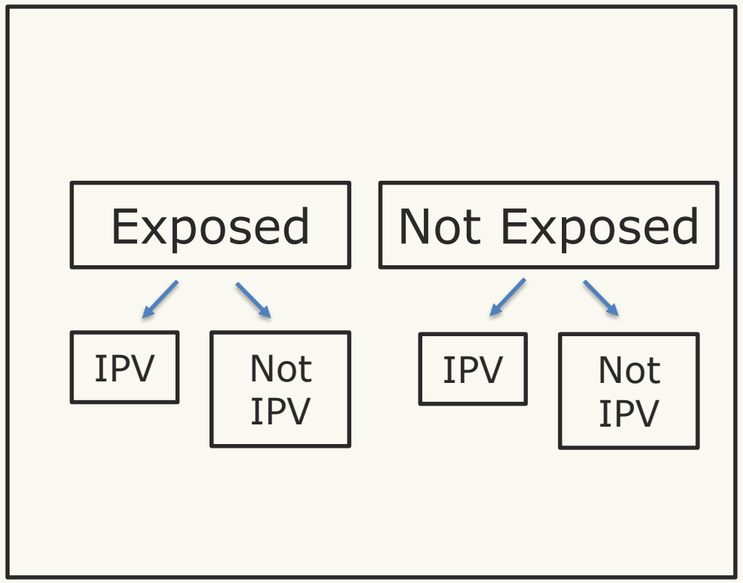
- Some popular experimental design :
  - RCT (Randomized Control Study)
  - Observational Study: Cohort Study, Case-control Study …

Experimental Design in Epidemiology

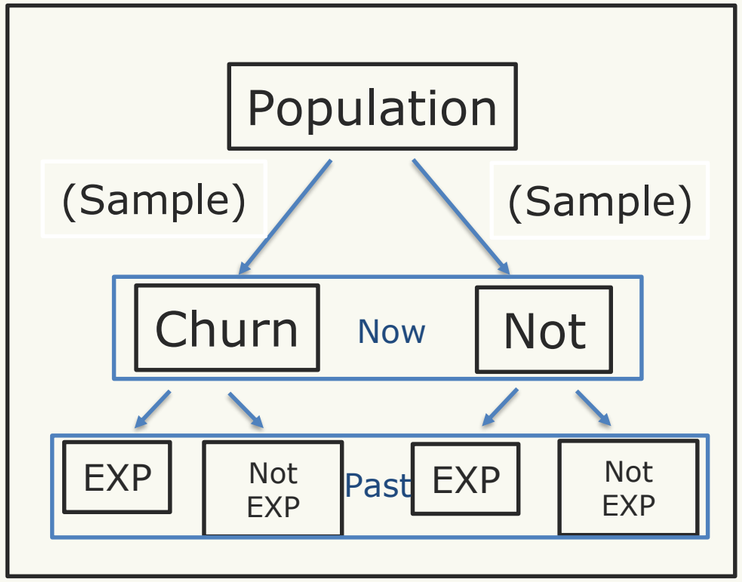
Conduct investigations to test hypothesis



1. RCT



2. Cohort Study



3. Case-control Study

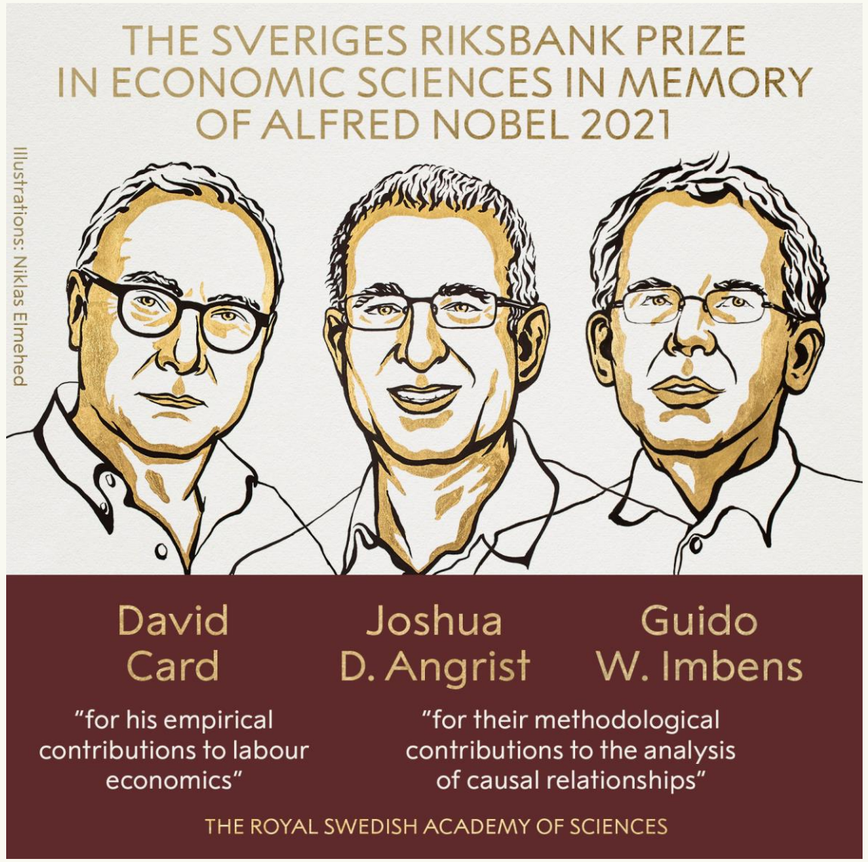
Source: Gordis Epidemiology, 4th Edition

Causal Inference in Econometrics

Draw causal conclusions based on data

Causal

Inference



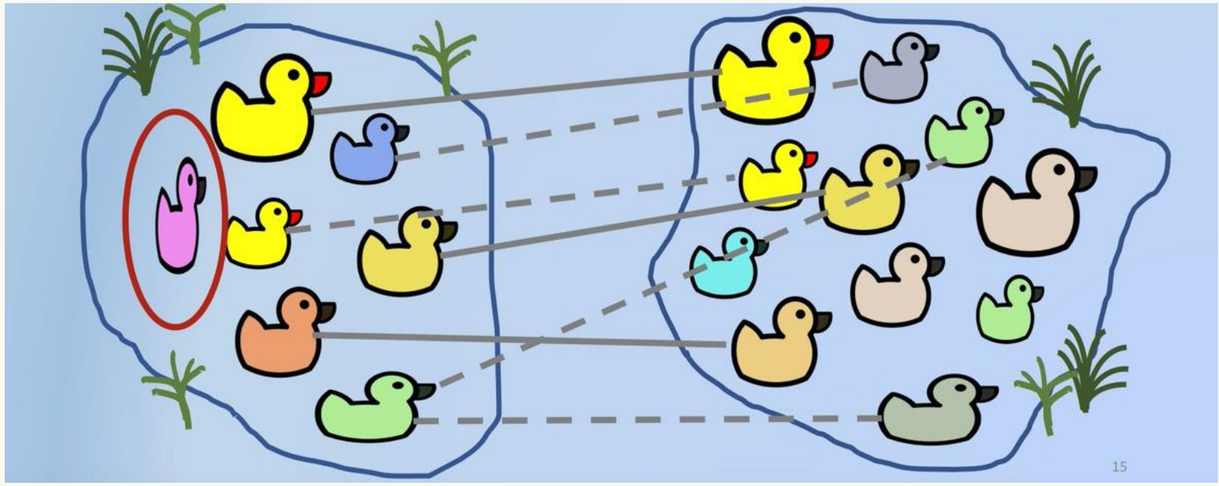
Source: Twitter(The Nobel Prize)

Causal Inference in Econometrics

Draw causal conclusions based on data

- Propensity Score Matching (PSM):
  - Get samples directly from control group, ensuring the samples in two groups are “alike”, then comparing their performance.

Treatment Group



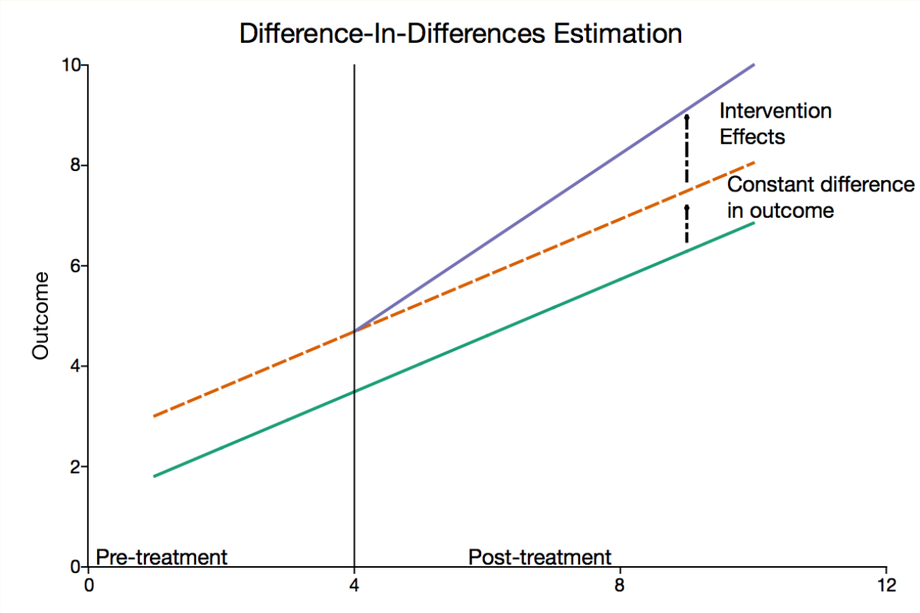
Control Group

Source: Twitter (HARCollaborative)

Causal Inference in Econometrics

Draw causal conclusions based on data

- Difference in Differences (DID):
  - Record two differences between treatment group and control group before and after invention, then get the difference of them again.

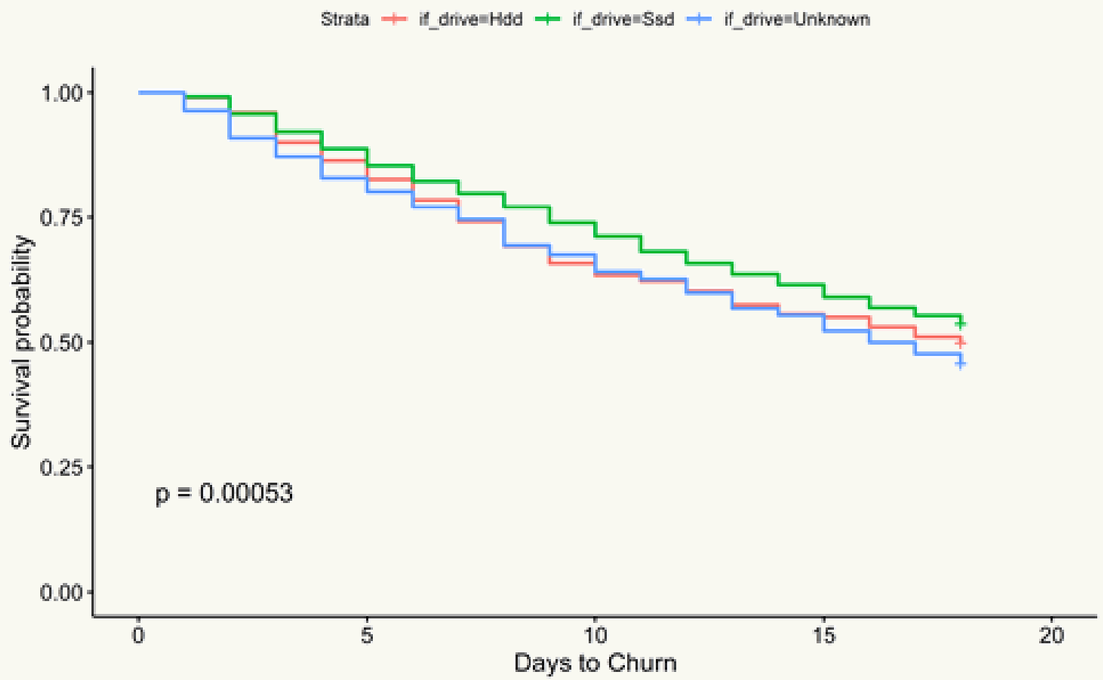


Source: aptech.com/blog

Part 4:
How to apply those methods in gamer churn analysis?

What Survival Analysis Brings?

Better comprehensive and interpretability

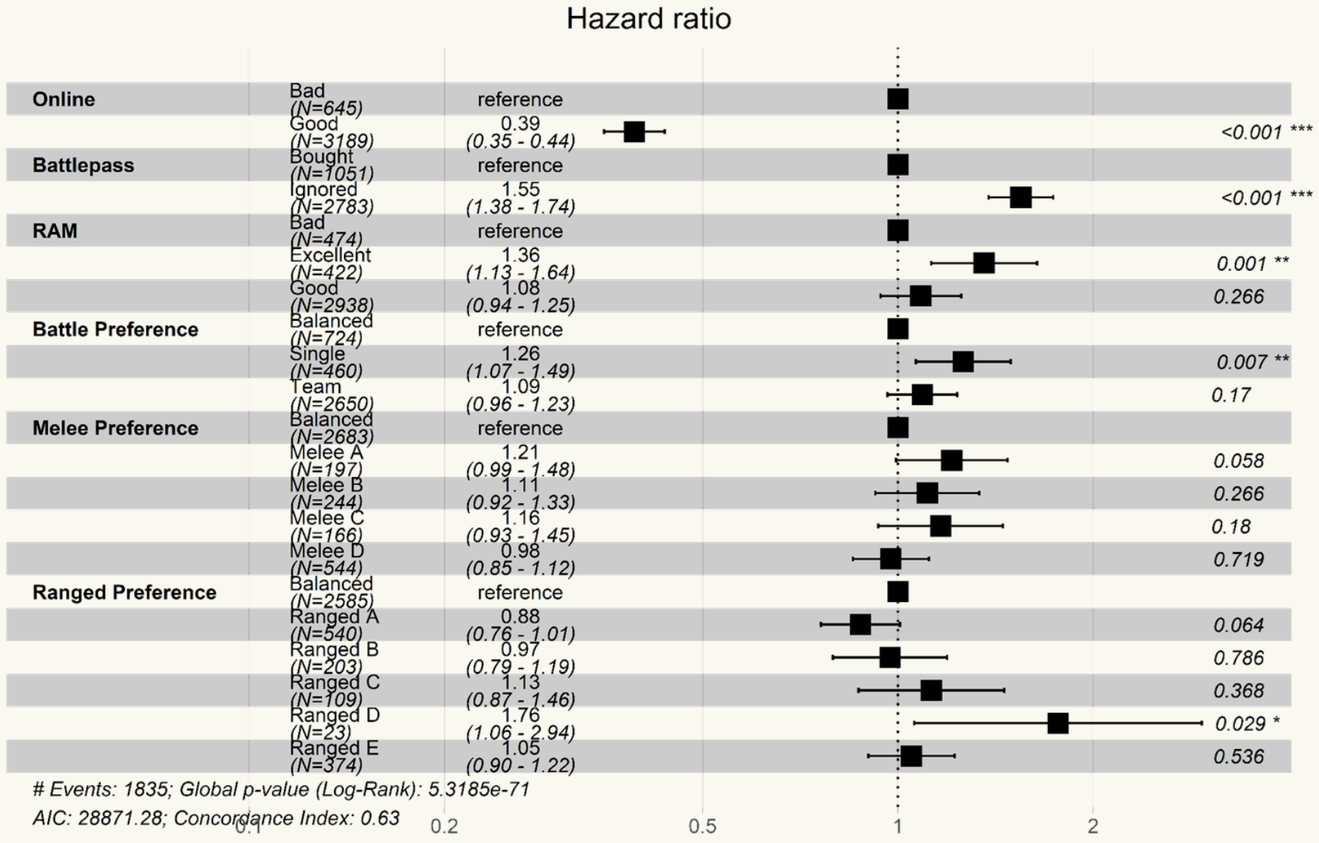


Kaplan Meier Curves and log-rank test results based on the feature “Drive”

- **Question:** How to plot churn probability for players with different kinds of drives?
- For people who put Naraka on a Ssd (Solid-state drive), their churn rate is relatively the lowest among the three groups

What Survival Analysis Brings?

Better comprehensive and interpretability



Hazard ratio forest plot for some features

- **Question:** How to know general relationship between churn and each feature?
- Briefly, a hazard ratio (HR) > 1 indicates an increased risk of churn if a specific condition is met by a gamer.
- An HR < 1, on the other hand, indicates a decreased risk.

What Experimental Design Brings?

Scientific methods and conscientiousness

- In our work, AB testing is more like a Cohort Study.

Choose A & B server as treatment & control group, respectively
⇒ Test ⇒ Analyze results

- Post-hoc game data analysis or gamer experience questionnaire analysis is more like a Case-control Study.

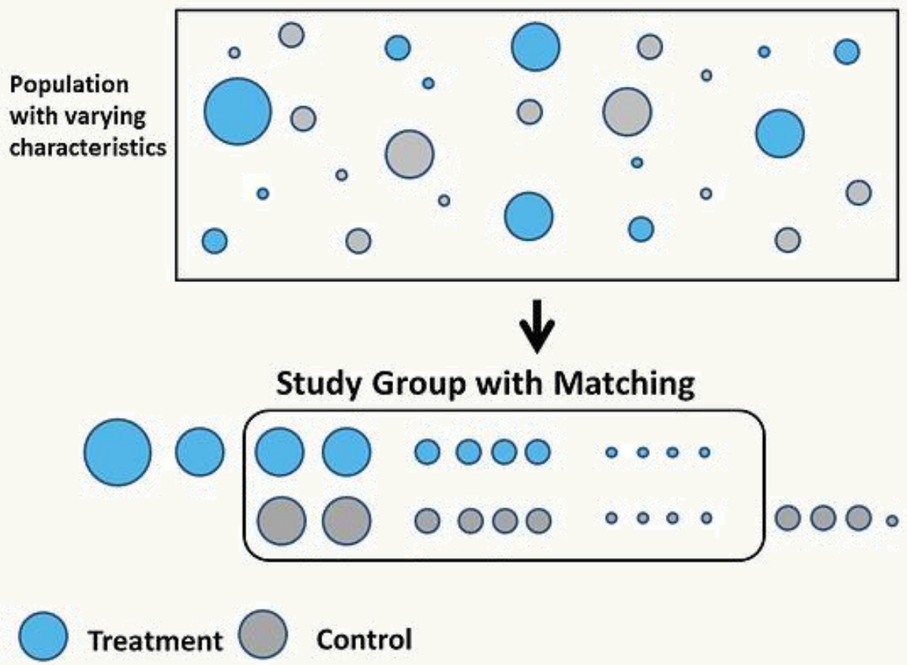
Fetch data from interested gamers who churn or do not churn
⇒ Analyze their important features ⇒ Plot results

- Why those above-mentioned methods are usually worse alternatives for RCT?

(Information Bias, Selection Bias)

What Econometrics Methods Brings?

Logical ways to infer causality after AB tests

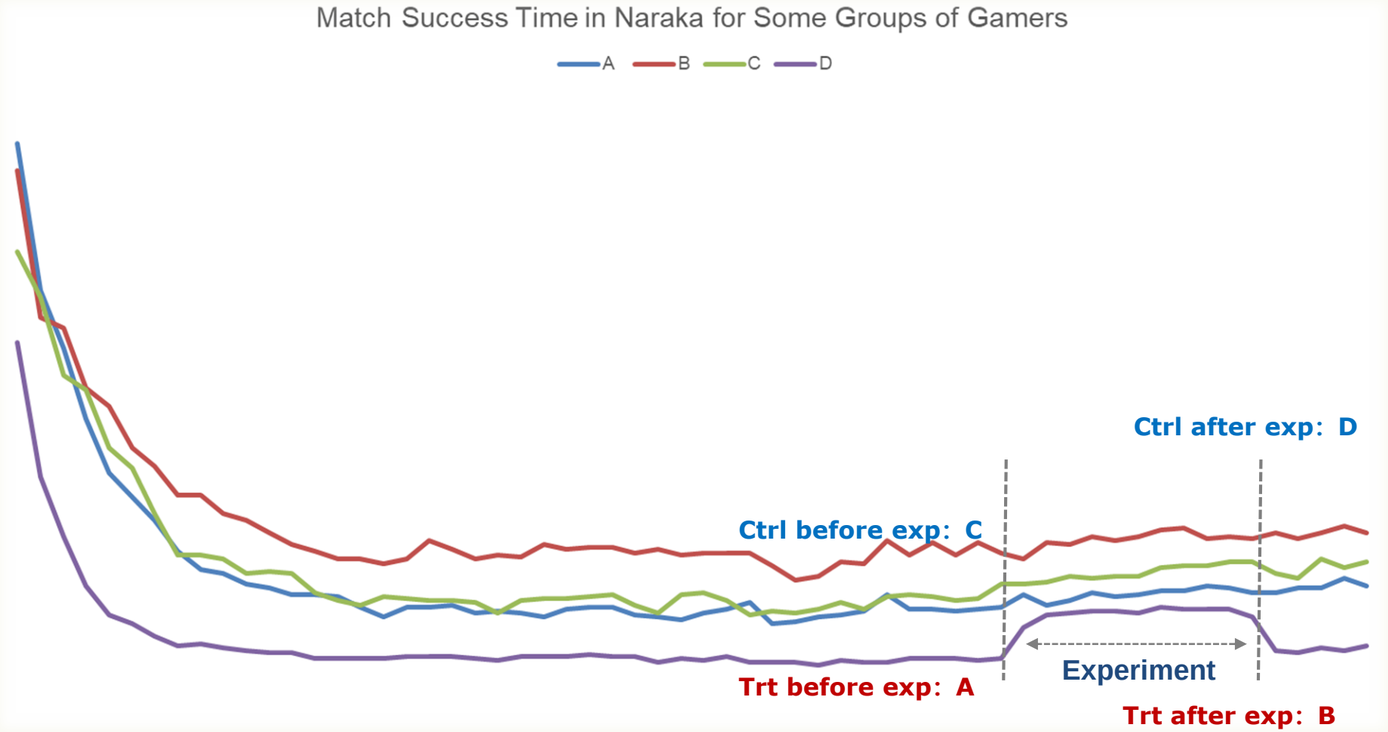


Source: summitllc.us

- **Question:** How to conduct PSM analysis?
- Feature candidates:
  the number of battles played, weapon/hero/mode preference, device, game version…
- R-Parameter setting:
  “method”, “ratio”…

What Econometrics Methods Brings?

Logical ways to infer causality after AB tests



Analyze results of an experiment

- **Question:** How to combine DID with statistical testing?
- DID: **“(B-A)-(D-C)”**
- Statistical tests

Part 5:
Takeaways

Takeaways

- Use behavioral data to understand what players want, and focus on anomalies.
- Conduct more A/B tests, considering the chance of doing causal inference.
- The analysis should be based on correct experimental design rules and scientific analysis methods, to avoid bias.

Thank you!