

EFFECTS OF INCENTIVES & COMMUNICATION CHANNEL ON UNDERGRADUATE STUDENTS' COVID-19 BOOSTER UPTAKE

GROUP 9

TIM, YEBIN, WOON, ZHENWEI, ZIKANG

CONTENT



RESEARCH PROBLEM

**EXPERIMENTAL
METHOD & OPERATIONS**

SIMULATION & ANALYTICAL PLANS

CONCLUSION





RESEARCH PROBLEM



RESEARCH QUESTIONS



COLUMBIA UNIVERSITY
MEDICAL CENTER



**Booster Shots
(Free & Voluntary)**



Community Safety



- 1) How to encourage students to respond faster
- 2) How to encourage more students to get booster shots

LITERATURE REVIEW

[1] VACCINATION



95%
Hesitancy



17% Higher
Immunization Rate

[2] COMMUNICATION CHANNEL



45%
Response Rate



6%
Response Rate

RESEARCH PLAN



Population of Interest Size: 5,000

Fully vaccinated Columbia undergraduate students

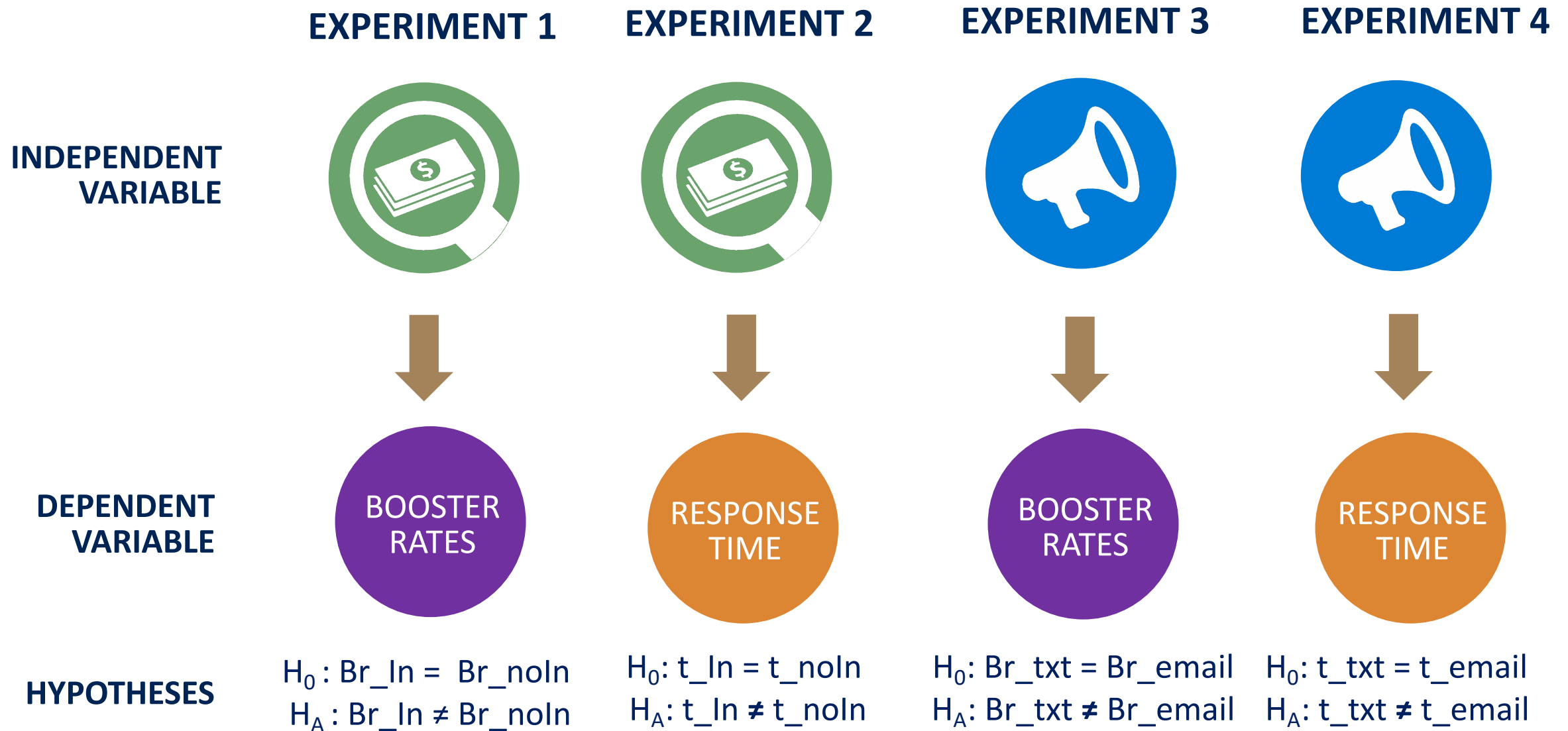


Stratified Sampling (academic year)



Sample (Total: 400)	Incentive (Treatment Group 1)	Non-incentive (Control Group 1)
Email (Control Group 2)	Group 1 (100 Students)	Group 2 (100 Students)
Text (Treatment Group 2)	Group 3 (100 students)	Group 4 (100 Students)

RESEARCH PLAN & HYPOTHESES





EXPERIMENTAL METHODS AND OPERATIONS



EXPERIMENT 1



effects of Incentives on the Booster Uptake Rates

$H_0 : Br_{In} = Br_{noIn}$

$H_A : Br_{In} \neq Br_{noIn}$

[GROUP 1]

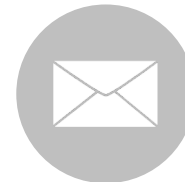


[GROUP 3]



VS

[GROUP 2]



[GROUP 4]



BOOSTER
RATES

EXPERIMENT 2



effects of Incentives on the Response Time

$H_0: t_{In} = t_{noIn}$

$H_A: t_{In} \neq t_{noIn}$

[GROUP 1]

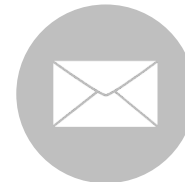


[GROUP 3]



VS

[GROUP 2]



[GROUP 4]



EXPERIMENT 3



effects of Communication Channels on the **Booster Uptake Rates**

H0: Br_txt = Br_email

HA: Br_txt \neq Br_email

[GROUP 1]



[GROUP 2]



VS

[GROUP 3]



[GROUP 4]



BOOSTER
RATES

EXPERIMENT 4



effects of Communication Channels on the **Response Time**

$H_0: t_{In} = t_{noIn}$

$H_A: t_{In} \neq t_{noIn}$

[GROUP 1]



[GROUP 2]



VS

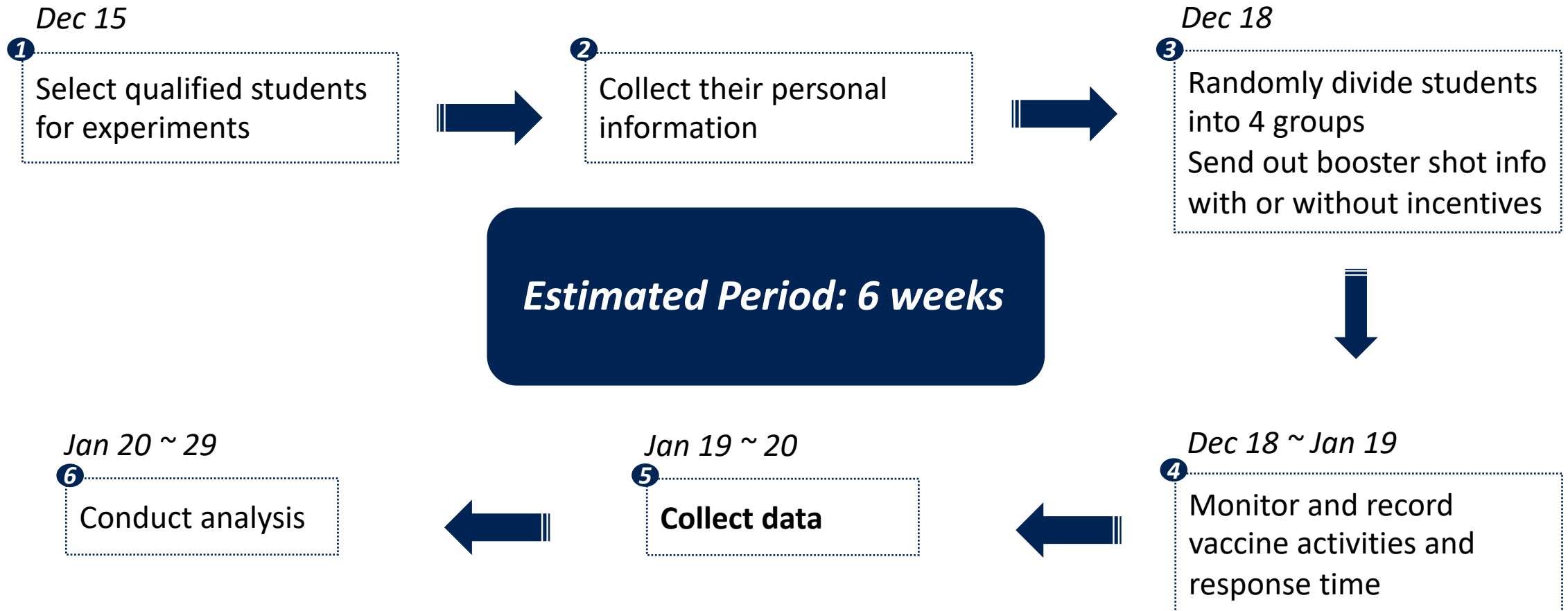
[GROUP 3]



[GROUP 4]



EXPERIMENT SCHEDULE AND PROCEDURE



DATA COLLECTION



Student Personal Information

Source: Administration Office

Data:

- UNI
- Gender
- Age
- Primary citizenship
- Local address
- Enrolled program
- History of red pass (Y/N)
- COVID-19 test results



Timestamp Data

**Source: Scheduled Messaging Tool
Cookie**

Data:

- Timestamp of messages sent
- Timestamp of messages opened
- Timestamp of links clicked
- Timestamp of booster shots booked
- Timestamp of students getting booster shots



SIMULATION & ANALYTICAL PLANS

DATA SIMULATION

Sample Size $n = 4 \text{ groups} \times 100$

Sample	Incentive	Non-incentive
Email	Group 1 (100)	Group 2 (100)
Text	Group 3 (100)	Group 4 (100)

Expected Effects with Experiment Repetition $B = 1,000$



GROUP 1&3

BOOSTER RATE
17% ▲



GROUP 3&4

BOOSTER RATE
200% ▲



GROUP 3&4

RESPONSE TIME
5310 SECONDS ▼

ANALYTICAL PLANS & FINDINGS FROM SIMULATION STUDIES

Two-way ANOVA test for combinatorial levels of independent variables

RESEARCH QUESTIONS

Incentives affect booster rate?

Communication channels affect booster rate?

Incentives affect response time?

Communication channels affect response time?

Run Test



TEST RESULTS

Incentives increase the booster uptake rate by 17%. 90.2% of the experiments successfully identified this effect

Text is twice as likely to make the students take the vaccine. 100% of the experiments successfully indicate this effect

Incentives do not affect the response time. 94.8% of the experiments successfully indicate this effect

Students are 10 times faster responding to texts than to emails. 100% of the experiments successfully indicate this effect.



CONCLUSION



RECOMMENDATION

RESEARCH QUESTIONS

Incentives affect booster rate?

Communication channels affect booster rate?

Incentives affect response time?

Communication channels affect response time?



IF TRUE



Use cash incentives to encourage students for booster

Use texts to notify students about the booster shot

Use cash incentives to elicit a faster response



Use texts to more promptly communicate with students



IF FALSE

Conduct booster shots w/o incentives

Use emails send out notifications

Try other methods to get faster responses

Use emails to send out notifications

LIMITATIONS



Unadjusted expected values

Our expected effect size based off available literatures. However, such effects are taken out of context and should be adjusted to fit our study.

For example, the literature that concludes text is twice as effective as email draw their conclusion from marketing experiment, which is different from our research design.



Unrealistic assumptions

We assumed full participation, but not everyone will respond to our messages.

THANK YOU

GROUP 9

TIM, YEBIN, WOON, ZHENWEI, ZIKANG