

W241_Simulation_Final

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Renaming Variables and Values

Power Calculation:

Table 1 summarizes the response rate for each treatment group. Each treatment group includes 120 participants, and the response rates for “*No Incentive*” group was 13.33%, for “*\$5 Incentive*” group was 20.83%, and for “*\$100 Lottery*” group was 9.17%.

Table 1: Response Rate by Treatment.

Treatment	Group Size	Response (N)	Response (%)
No Incentive (Control)	120	16	13.33
\$5 Incentive	120	25	20.83
\$100 Lottery	120	11	9.17

Note. Summary response rate by treatment.

The experiment was designed to achieve 80% power, with a expected response rate of 5% for the “No Incentive” group and 16% for the “\$5 Incentive” group. The power simulation recommended groups of 120 participants. These expected response rates were defined based on observed response rates for studies using similar incentives. Relatively low expected response rates to reflect the following:

- Participants were given only two weeks to respond (from October 31st to November 14th).
- One of the two weeks was a break at MIDS (Nov 8th to Nov 14th).
- No reminder was sent to participants.

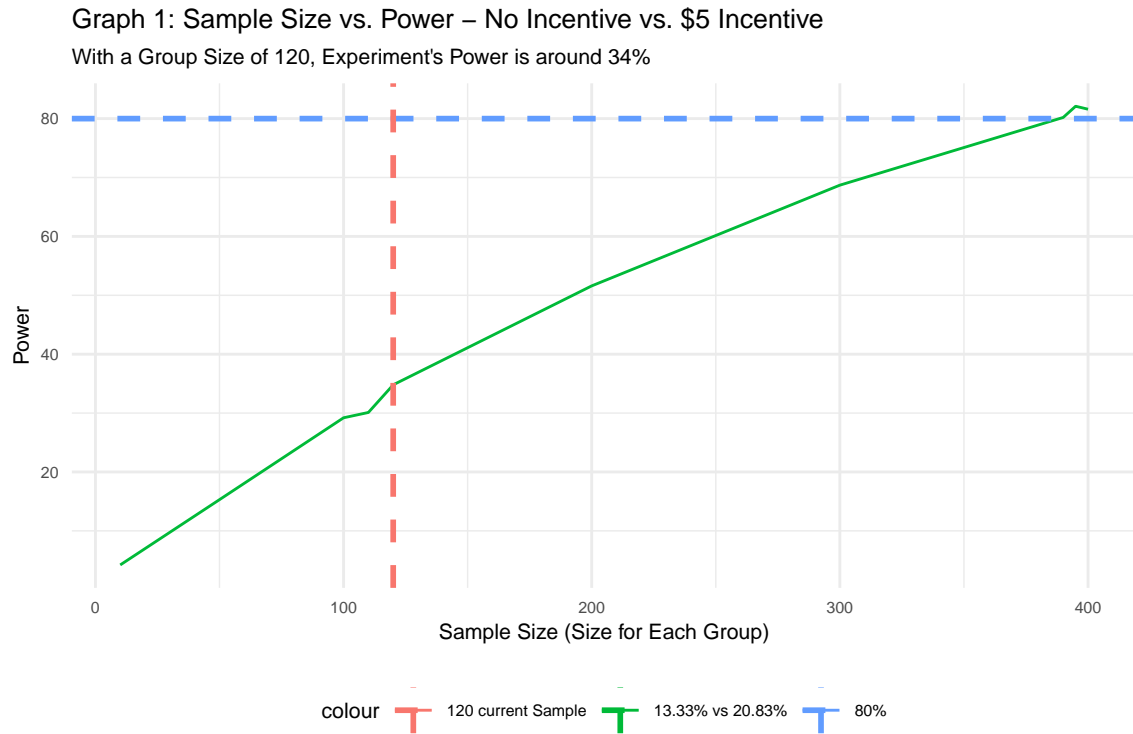
Given the the observed response rates (see Table 1) in the experiment, using the power simulation comparing the “No Incentive” and “\$5 Incentive” groups, **Table 2** presents a summary of the power calculation for different sample sizes. Based on this simulation, the power for this experiment (120 participants per group) is around 34.8%. To achieve a power of 80%, it requires groups of around 395.

Table 2: Power Calculation:

Sample	Power (%)
10	4.21
50	15.30
100	29.20
110	30.10
120	34.80
200	51.60
300	68.70
390	80.20
395	82.10
400	81.60

Note. No Incentive vs. \$5 Incentive.

Graph 1 presents the power calculation curve for “No Incentive” versus “\$5 Incentive” groups. The red line indicates the power for the current experiment given the observed response rates with group sizes of 120 participants.



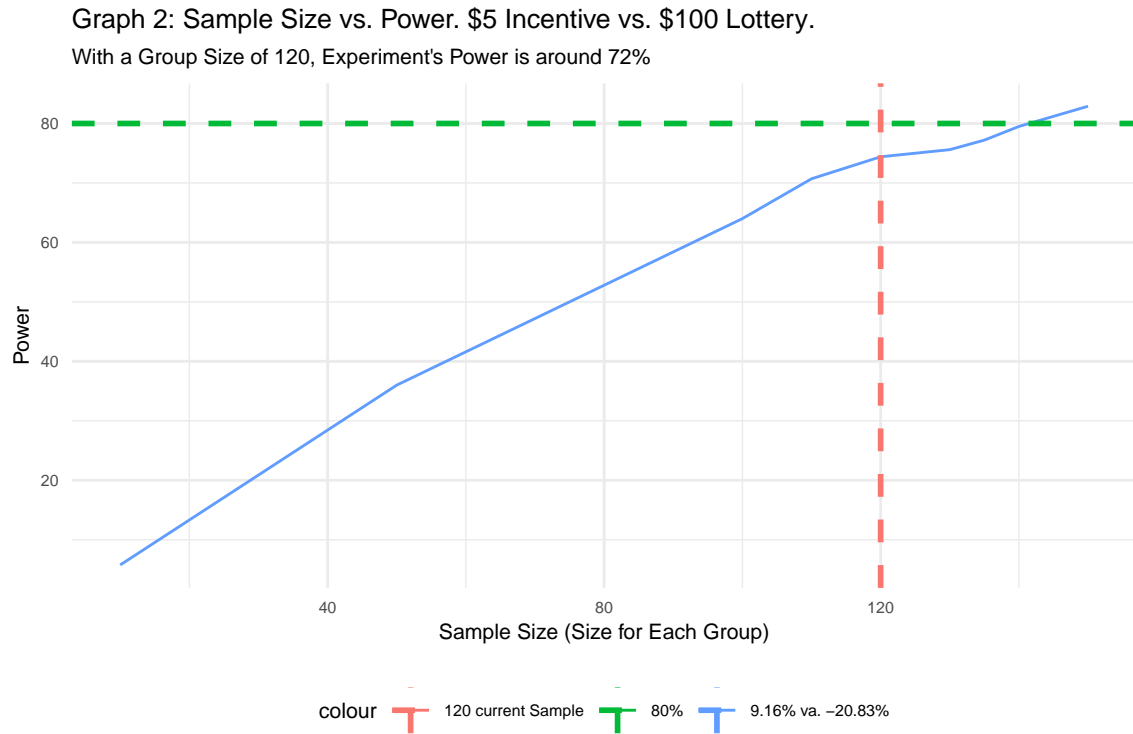
In addition, using the power simulation comparing the “\$5 Incentive” and “\$100 Lottery” groups, given the observed response rates (see Table 1), **Table 3** presents a summary of the power calculation for different experiment sample sizes. Based on this simulation, the power for this experiment (120 participants per group) is around 74.4%. To achieve a power of 80%, it is required groups of around 145 participants (given the observed response rates).

Table 3: Power Calculation:

Sample	Power (%)
10	5.76
50	36.00
100	64.00
110	70.70
120	74.40
130	75.60
135	77.20
140	79.50
145	81.20
150	82.90

Note. \$5 Incentive vs. \$100 Lottery.

Graph 2 presents the power calculation curve for “\$5 Incentive” versus “\$100 Lottery” groups. The red line indicates the power for the current experiment given the observed response rates, and group sizes of 120 participants.



#T-Test Analysis:

T-test analysis was performed to compare the following response rates:

- (1) “\$5 Incentive” group (20.83%) vs. “No Incentive” group (13.33%).
- (2) “\$100 Lottery” group (9.17%) vs. “No Incentive” group (13.33%).

- (3) “\$100 Lottery” group (9.17%)vs. “\$5 Incentive” group (20.83%).

The table below presents a summary of t-test results. In summary:

- (1) With a p-value of 0.1237585 (> 0.05), we fail to reject the null hypothesis of the average response rate being equal. Thus, there is not enough evidence supporting that the average response rates for “\$5 Incentive” (20.83%) is statistically different from the average response rates for “No Incentive” (13.33%), at a 95% confidence.
- (2) With a p-value of 0.3090886 (> 0.05), we fail to reject the null hypothesis of the average response rate being equal. Thus, there is not enough evidence supporting that the average response rates for “\$100 Lottery” (9.17%) is statistically different from the average response rates for “No Incentive” (13.33%), at a 95% confidence.
- (3) With a p-value of 0.011323 (< 0.05), we reject the null hypothesis of the average response rate being equal. Thus, there is not enough evidence supporting that the average response rates for “\$100 Lottery” (9.17%) is statistically different from the average response rates for “\$5 Incentive” (20.83%), at a 95% confidence.

Table 4: T-Test Summary Table:

Comparison	P-Value	CI_Lower	CI_Upper	Mean Grp 1	Mean Grp 2
No Treatment vs. \$5 Incentive	0.12	-0.02	0.17	0.21	0.13
No Treatment vs. \$100 Lottery	0.31	-0.12	0.04	0.09	0.13
\$5 Incentive vs. \$100 Lottery	0.01	-0.21	-0.03	0.09	0.21

Note. Comparing \$5 Incentive versus other treatments.

Treatment - Group Analysis:

Table 5: Group Distribution and Response Rate by Cohort and Treatment Group:

Cohort	Treatment Group	Size	Response (N)	Response Rate (%)
Summer 2020	No Incentive (Control)	24	2	0.08
Summer 2020	\$5 Incentive	24	6	0.25
Summer 2020	\$100 Lottery	24	1	0.04
Fall 2020	No Incentive (Control)	24	0	0.00
Fall 2020	\$5 Incentive	24	4	0.17
Fall 2020	\$100 Lottery	24	4	0.17
Spring 2021	No Incentive (Control)	24	5	0.21
Spring 2021	\$5 Incentive	24	3	0.12
Spring 2021	\$100 Lottery	24	1	0.04
Summer 2021	No Incentive (Control)	24	4	0.17
Summer 2021	\$5 Incentive	24	4	0.17
Summer 2021	\$100 Lottery	24	0	0.00
Fall 2021	No Incentive (Control)	24	5	0.21
Fall 2021	\$5 Incentive	24	8	0.33
Fall 2021	\$100 Lottery	24	5	0.21

Note. Covariate analysis - checking for balance of cohorts across treatment groups.

\begin{table}[H]

\caption{Group Distribution and Response Rate by Treatment and In_PST:}

Treatment Group	In PST	Size	Response (N)	Response Rate (%)
No Incentive (Control)	1	54	8	0.15
No Incentive (Control)	0	66	8	0.12
\$5 Incentive	0	68	15	0.22
\$5 Incentive	1	52	10	0.19
\$100 Lottery	1	54	8	0.15
\$100 Lottery	0	66	3	0.05

Note. Covariate analysis - checking for balance in In_PST across treatment groups.

\end{table}

No Incentive (Control) and \$100 Lottery treatment share the same number of observations who are in_PST, so no covariate balance check is needed. However, No Incentive (Control) and \$5 Incentive treatment differ in the number of observations who are in_PST, so a covariate balance check is needed.

Covariate Balance Check on PST: No Incentive vs. 5 Per Survey Incentive

<i>Dependent variable:</i>	
	in_PST
5 Dollar Incentive	-0.017 (0.065)
Baseline	0.450*** (0.046)
Observations	240
R ²	0.0003
Adjusted R ²	-0.004
Residual Std. Error	0.499 (df = 238)
F Statistic	0.067 (df = 1; 238)

Note: * p<0.1; ** p<0.05; *** p<0.01

Randomization was successful because the covariate balance check reveals that the proportion of observations in_PST does not differ statistically significantly between control and the \$5 Incentive treatment.

Regression Tables

Between No Incentive vs. \$5 Incentive

Table 1: Linear Regression - No Incentive vs. 5 Per Survey Incentive

<i>Dependent variable:</i>				
	Response Rate			
	Simple	Cohort Included	PST included	Cohort and PST included
	(1)	(2)	(3)	(4)
5 Dollar Incentive	0.075 (0.049)	0.075 (0.049)	0.075 (0.049)	0.075 (0.049)
Fall 2020		-0.083 (0.067)		-0.083 (0.068)
Fall 2021		0.104 (0.085)		0.104 (0.085)
Spring 2021		0.000 (0.078)		-0.0002 (0.078)
Summer 2021		0.000 (0.078)		-0.0003 (0.078)
In PST			-0.001 (0.049)	0.002 (0.049)
Baseline	0.133*** (0.031)	0.129** (0.055)	0.134*** (0.037)	0.129** (0.057)
Cohort fixed effects	No	Yes	No	Yes
PST fixed effects	No	No	Yes	Yes
Baseline is:	5 dollar.	5 dollar, Summer 2020.	5 dollar, Not PST.	5 dollar, Summer 2020, Not PST.
Observations	240	240	240	240
R ²	0.010	0.035	0.010	0.035
Adjusted R ²	0.006	0.014	0.002	0.010
Residual Std. Error	0.376 (df = 238)	0.374 (df = 234)	0.377 (df = 237)	0.375 (df = 233)
F Statistic	2.386 (df = 1; 238)	1.694 (df = 5; 234)	1.188 (df = 2; 237)	1.406 (df = 6; 233)
<i>Note:</i>				*p<0.1; **p<0.05; ***p<0.01

Between No Incentive vs \$100 Lottery

Table 2: Linear Regression - No Incentive vs. 100 Lottery Win

	<i>Dependent variable:</i>			
	Response Rate			
	Simple (1)	Cohort Included (2)	PST included (3)	Cohort and PST Included (4)
100 Dollar Lottery Incentive	-0.042 (0.041)	-0.042 (0.041)	-0.042 (0.041)	-0.042 (0.041)
Fall 2020		0.021 (0.055)		0.021 (0.055)
Fall 2021		0.146** (0.070)		0.147** (0.070)
Spring 2021		0.063 (0.060)		0.053 (0.059)
Summer 2021		0.021 (0.054)		0.018 (0.054)
In PST			0.065 (0.042)	0.067 (0.042)
Baseline	0.133*** (0.031)	0.083* (0.043)	0.104*** (0.036)	0.055 (0.049)
Cohort fixed effects	No	Yes	No	Yes
PST fixed effects	No	No	Yes	Yes
Baseline is:	5 dollar.	5 dollar, Summer 2020.	5 dollar, Not PST.	5 dollar, Summer 2020, Not PST.
Observations	240	240	240	240
R ²	0.004	0.031	0.015	0.042
Adjusted R ²	0.0002	0.011	0.006	0.018
Residual Std. Error	0.317 (df = 238)	0.315 (df = 234)	0.316 (df = 237)	0.314 (df = 233)
F Statistic	1.039 (df = 1; 238)	1.521 (df = 5; 234)	1.775 (df = 2; 237)	1.720 (df = 6; 233)
<i>Note:</i>				*p<0.1; **p<0.05; ***p<0.01

Between \$5 Incentive vs \$100 Lottery

Table 3: Linear Regression - 5 Per Survey Incentive vs. 100 Lottery Win

	<i>Dependent variable:</i>			
	Response Rate			
	Simple (1)	Cohort Included (2)	PST included (3)	Cohort and PST Included (4)
100 Dollar Lottery Incentive	-0.117** (0.046)	-0.117** (0.046)	-0.117** (0.046)	-0.117** (0.046)
Fall 2020		0.021 (0.075)		0.022 (0.076)
Fall 2021		0.125 (0.082)		0.122 (0.082)
Spring 2021		-0.063 (0.065)		-0.065 (0.065)
Summer 2021		-0.063 (0.064)		-0.068 (0.063)
In PST			0.037 (0.047)	0.042 (0.046)
Baseline	0.208*** (0.037)	0.204*** (0.061)	0.192*** (0.043)	0.188*** (0.066)
Cohort fixed effects	No	Yes	No	Yes
PST fixed effects	No	No	Yes	Yes
Baseline is:	5 dollar.	5 dollar, Summer 2020.	5 dollar, Not PST.	5 dollar, Summer 2020, Not PST.
Observations	240	240	240	240
R ²	0.027	0.064	0.029	0.067
Adjusted R ²	0.023	0.044	0.021	0.043
Residual Std. Error	0.354 (df = 238)	0.350 (df = 234)	0.354 (df = 237)	0.350 (df = 233)
F Statistic	6.526** (df = 1; 238)	3.200*** (df = 5; 234)	3.590** (df = 2; 237)	2.807** (df = 6; 233)
<i>Note:</i>				*p<0.1; **p<0.05; ***p<0.01

Big Regression Tables

Table 4: Linear Regression - Including All Treatments

	<i>Dependent variable:</i>			
	Response Rate			
	Simple (1)	Cohort Included (2)	PST Included (3)	Cohort and PST Included (4)
100 Dollar Lottery Incentive	-0.117** (0.046)	-0.117** (0.046)	-0.117** (0.046)	-0.117** (0.046)
No Incentive	-0.075 (0.049)	-0.075 (0.049)	-0.076 (0.049)	-0.076 (0.049)
Fall 2020		-0.014 (0.054)		-0.014 (0.054)
Fall 2021		0.125* (0.064)		0.124* (0.065)
Spring 2021		-0.000 (0.055)		-0.004 (0.055)
Summer 2021		-0.014 (0.054)		-0.019 (0.053)
In PST			0.034 (0.038)	0.037 (0.037)
Baseline	0.208*** (0.037)	0.189*** (0.053)	0.194*** (0.041)	0.175*** (0.056)
Cohort fixed effects	No	Yes	No	Yes
PST fixed effects	No	No	Yes	Yes
Baseline is:	5 dollar.	5 dollar, Summer 2020.	5 dollar, Not PST.	5 dollar, Summer 2020, Not PST.
Observations	360	360	360	360
R ²	0.019	0.042	0.021	0.044
Adjusted R ²	0.013	0.025	0.013	0.025
Residual Std. Error	0.350 (df = 357)	0.348 (df = 353)	0.350 (df = 356)	0.348 (df = 352)