Assignment #5

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1. Experiments on Amazon Mechanical Turk

(a) The experiment I choose is the Investment experiment requested by Fynn Gerken.[1] This is an academic investment experiment which involves viewing material and answering three short qualification questions.

(b) As for the full payment structure, the flat rate is $0.50 and there is bonus which not exceeds $0.75. This bonus is designed for 3 comprehension questions, you could get this bonus if you could give correct answers to these comprehension questions and each comprehension question has equal bonus --$0.25.

(c) There indeed some required qualifications for this experiment: first of all, the location should be in U.S. Second, HIT approval rate is greater than 95%. Third, previous participation has not been granted. Finally, investment experience is 100.

(d) This job cost about 10 minutes and allotted time for participants is 30 minutes. And the implied hourly rate should depend on how many comprehension questions you can give correct answers. If you just take this experiment without any correct answers to comprehension questions, the implied hourly rate should be $3 per hour. If you have one correct answer to one comprehension question, the implied hourly rate should be $4.5 per hour. If you have two correct answers to comprehension questions, the implied hourly rate should be $6 per hour. If you have all correct answers to comprehension questions, the implied hourly rate should be $7.5 per hour.

(e) This job expires on Nov.27, 2018.

(f) If one million people participated in this project, the most cost of this project would be $125000 by assuming all participants have correct answers to all comprehension questions. This is the largest possible expenditure but actual expenditure may be less than this value.

Reference

https://worker.mturk.com/?filters%5Bsearch_term%5D=experiment&page_size=100&page_number=1&sort=reward_desc&filters%5Bmin_reward%5D=0.01

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[1] https://worker.mturk.com/?filters%5Bsearch_term%5D=experiment&page_size=20&page_number=1&sort=num_hits_desc&filters%5Bmin_reward%5D=0.01

2. Costa and Kahn (2013)

This paper aims to answer the research question that how political ideology and environmentalism mediates people's response to "peer comparison information", more specifically, "energy conservation nudges" (Costa & Kahn, 2013, p.681, p.698)?

In order to answer this research question, the authors conducted a randomized field experiment. The primary data set is the "residential billing data from January 2007 to October 2009" (Costa & Kahn, 2013, p.685) which was obtained from the regional utility. These data include "information on kilowatt hours purchased per billing cycle, the length of the billing cycle (measured in days), whether the house uses electric heat and whether the household is enrolled in the electric utility's program to purchase energy from renewable" (Costa & Kahn, 2013, p.685). Besides, the authors also combined another data set of "individual voter registration and marketing data for March 2009" (Costa & Kahn, 2013, p.685) which was purchased from www.aristotle.com. This data set can provide with other information for registered voters in this district such like "their party affiliation and whether the individual donates to environment organizations" (Costa & Kahn, 2013, p.685). Also, the authors used the daily temperature data to calculate the average temperature in the corresponding billing cycle (Costa & Kahn, 2013, p.685). In addition, the authors also selected another data set to examine "household attitudes about the HER (Home Electricity Reports) by ideology" (Costa & Kahn, 2013, p.686) which came from the survey conducted by the electric utility company in 2009.

In this experiment, the authors selected target households based on several criterions: they are "85 census tracts with a high density of single-family homes" (Costa & Kahn, 2013, p.683), they have valid and active account for electric usage and the size of house. Then these households were randomly divided into two groups – the treatment group and the control group. More precisely, "the treatment and control data therefore contain 81722, with 48058 households in the control group." (Costa & Kahn, 2013, p.685) For treatment group, "24028 received a monthly report and 9636 received a quarterly report" (Costa & Kahn, 2013, p.685). While the control group never received any Home Electricity Report. The treatment in this experiment was the households in treatment group received monthly or quarterly Home Electricity Reports.

Compared with the previous work of Schultz et al. (2007), they are different in the way of controlling participants' heterogeneity. For Schultz et al, they controlled the participants' heterogeneity just by telling whether they were "above or below the average of the energy consumption dummy"(Schultz et al., 2007, p.430). In the contrast, Costa, Kahn (2013) introduced other extra layers, including the month and year fixed effects, the intersection of mean daily temperature within the corresponding billing cycle, party registration, green indicators, a dummy indicator indicating whether the house is electric and some other characteristics of blocks and

houses, etc. (Costa & Kahn, 2013, p.689).

Costa and Kahn (2013) found that "liberal households are less likely to drop out of the experiment and more likely to report that they like receiving the report than political conservatives. In response to receiving the report, liberals reduce their electricity consumption by a larger percentage than conservatives" (Costa & Kahn, 2013, p.698). In other words, this kind of "energy conservation nudges" are more effective in liberal community blocks.

Reference:

1. Costa, Dora L. and Matthew E. Kahn, "Energy Conservation Nudges and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment," Journal of the European Economic Association, June 2013, 11 (3), 680–702.
2. Schultz, P. Wesley, Jessica M. Nolan, Robert B. Cialdini, Noah J. Goldsteinand, and Vladas Griskevicius, "The Constructive, Destructive, and Reconstructive Power of Social Norms," Psychological Science, 2007, 18 (5), 429–434.

3. Analytical exercise

(a) In this experiment, researchers aimed to estimate the effect of receiving text message reminders on vaccination uptake. Given the budget constraint, we basically have two strategies. First, we focus our resources on a small number of clinics and further we can have more patients for each clinic. Second, we spread our resource more widely. Which strategy is more proper is determined by if it meets the "Stable Unit Treatment Value Assumption (SUTVA)" which means no spillover (no interference) and no hidden treatments (excludability) (Salganik, 2018, pp. 203-209). For the first strategy, the condition is that there are few or none unobserved factors that will cause the heterogeneity among clinics, in other words, the 150 clinics are similar, and no spillover effects among these clinics. If this condition is satisfied, we can just focus on a small number of clinics. In a word, if it meets the two assumptions of SUTVA, we will choose the first strategy. However, if the clinics fails to meet the SUTVA, we have to spread our resource widely to ensure the randomization. By randomizing, we could balance the unobserved factors to get unbiased estimates.

(b) Several factors may affect the smallest effect size that we are able to detect. First, the smallest effect size is determined by researchers' target precision level. When a higher precision level is desired, we have to get a smaller standard error of average treatment effect (ATE) when we use the average treatment effects as estimating the difference between two sample means or a smaller standard error in difference-in-differences approach. In other words, the smallest effect size is lager when we desire a higher precision level. Second, experiment design also affects the smallest effect size. Such like the number of patients, the number of patients assigned to the treatment group and the number of patients assigned to the control group. Besides, we could use some mixed designs such as difference-in- difference estimator or ANCOVA-based approaches and so a smaller the smallest effect size. Third, the variance of potential outcomes in treatment group and control group and the covariance between them, the larger they are, the larger $SE(\widehat{ATE})$ is, then it leads to the smaller the effect size.

Reference:

Salganik, Matthew J., Bit by Bit: Social Research in the Digital Age, Princeton University Press, 2018.