Research Proposal for Experiments and Causal Inference, Fall 2019

Analyzing Consumer Behavior: Studying the role of emotion over logic in buying lottery

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Introduction

Lottery is a billion dollar industry in America. Every year Americans spend around $70 billion in lottery[1]. The jackpot cash prizes ranging from a $10 to a few millions are surely expected to guide the emotions of the ticket purchasers. Its surprising to note that large amount of money also goes unclaimed. According to a CNN report around $800 million in lottery money was unclaimed in 2011. One of the reasons cited was that the news of a jackpot winner in another state discourages people from even checking their tickets for the smaller prize[2]. This reflects the extent of the role of emotion.

For instance, let's consider Powerball, one of the most popular lotteries wherein participants have to guess the numbers on 6 balls(5 white balls numbered 1-69 and one red ball numbered 1-26, also called the powerball) in order to win the jackpot. Apart from jackpot, prizes can also be won for matching 1 or 2 balls along with powerball, and 3,4 or 5 numbers on the white ball with or without the powerball or just the number on the powerball. The odds of winning a Powerball jackpot is around 1 in 300 million[3]. Still, when people miss the ticket by one number believe that they were so close and just missed it. Does this motivate them to try again, even though logically their chances of winning in the next again are equal to the person who couldn't even guess a single number or who did not even play last time? For each winning ticket there will be a group of people who will be 1 number away from winning any prize or winning a higher prize. Someone who just matched 2 balls could have won the higher prize for 3 balls if one more number had matched.

So it would be interesting to explore if people are guided by their emotions while playing lottery and to measure this we will try to find out that

Research Hypothesis

The research hypothesis is that losing a lottery by just one number makes people more likely to play again than someone whose ticket did not match a single number in the jackpot sequence. In other words, a person one distance away from the winning ticket will be highly likely to replay the lottery than a person whose ticket did not match a single

number. To track this we can count the average number of times a person will replay the lottery when they match all but one number in the winning jackpot.

Experiment and Proposal

Around 70% of people in the age group of 20-30 years tend to buy a lottery ticket once in a year[1]. Also, men tend to play lottery slightly more often(once in 18 days) as compared to women(once in 11 days)[1]. So for the purposes of our study we will consider college students.

The experiment will be conducted in an offline manner at the college campus. Students could be invited to participate in the study by offering free pizzas. Once a student decides to participate, they will be given an iPad or a tablet to play a lottery game using an app. They will provide their age and gender on the app. Based on their gender every alternate male and alternate female would be given treatment and control. This will ensure that both treatment and control have nearly equal distribution of men and women. To play the game, the participant will enter a sequence of six numbers on the app. Then they will press the play button, that will generate the sequence for the winning ticket. If this generated sequence of the winning ticket matches the sequence entered by the participant they will win the jackpot. We can also keep some jackpot prize such as $10. This sequence would be based on whether the app has assigned the participant to the treatment or the control group. For control group the sequence generated would be completely different from the one entered by the participant. For the treatment group the sequence would just differ from the one entered by the participant in any one number randomly.

For instance, let's assume that a male participant entered the sequence as {5,14,3,20,30,22} and was assigned to the control group. Now, one of the sequences generated by the app could be {33,10,42,18,2,19}. None of the numbers in this sequence matched in the one given by the participant. Now, the next male participant would be assigned to the treatment group. Let's assume that he enters the sequence as {66,32,27,9,33,12}. One of the possible sequences generated for this participant by the app could be {66,32,27,9,33,14}.

The participant will also have the option to play again using the replay button. On pressing replay, another winning ticket sequence would be generated based on whether the participant was assigned to treatment(a sequence at a distance of 1 from winning ticket) or control(a completely different sequence) previously. We can also ask the participant to enter a new sequence for their choice as well but that might lead to an early dropout from the study as the effort of entering the sequence again might make they leave the game rather than replaying. But this is something that we can test in pilot phase. If a lot of participants express their willingness to change the sequence, we can add an option of changing the sequence or continuing with the previous one at the press of 'replay' button.

The outcome we'd be most interested in is the number of times a participant replays the game. We expect the average number of replays to be higher for the treatment group than the control group. This would be our treatment effect. Apart from tracking the average treatment effect, we'll be analyzing its statistical power using p-value. For this, we'll have to create data for potential outcomes of control if they were given the treatment and for the potential outcomes of treated group if they were not treated. We can do this by adding and subtracting the average treatment effect value from each observation based on its assigned group. We can also find the 95% confidence interval that will give us a range of where the actual treatment effect can be expected to lie in.

One of the major risks associated with this experiment is that participants may overuse the 'replay' option or not use it at all. Some participants might believe that this is an experiment, so the app would be rigged, and they won't win anything. So they might not bother to replay the game and prefer to leave with the free pizza even though they were assigned to treatment group. On the other hand, since there is no actual purchase of ticket required to replay the game and it can be done just by the tap on a button some participants even in the control group could use it more than usual or even the participants in the treatment group might overuse it. But we can rely on randomization and believe that the existence of people of both extremes will cancel out the effect of each other and other confounding factors as income and age of since students are selected randomly.

1. https://www.creditdonkey.com/lottery-winner-statistics.html
2. https://budgeting.thenest.com/old-can-lottery-ticket-turn-win-33843.html
3. https://www.king5.com/article/news/local/verify/verify-theres-only-one-way-to-increase-your-lottery-odds-and-your-chances-are-still-basically-zero/507-605708625