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Running head: THE INFLUENCE OF INCENTIVES ON CHOICE

Can Different Incentives Influence Participants' Choice?

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Abstract

Monetary incentives are used to encourage people to perform a variety of different actions. Increasingly, they are used to encourage actions that are directly beneficial to individuals, such as engaging in healthy behaviors or quitting addictive drugs. Interestingly, however, there is little research comparing the effectiveness of different types of incentive schemes. The current project compares the effectiveness of incentive schemes that offer sure payments versus lotteries of equal expected value. Specifically, two studies examine whether people are more likely to participate in a task if they are offered: (1) a fixed sure payment, (2) a lottery of equal expected value, or (3) a choice between the sure payment and lottery. We hypothesize that lotteries will be the most effective incentive and that a choice between a lottery and a fixed payment will be least effective. We then examine which incentive people are more likely to select, when presented with a choice between a lottery and a fixed payment. We hypothesize that, even though lotteries provide greater motivation, people will tend to select fixed payments over lotteries if given a choice. Study 1 addressed these questions in the context of a campus blood drive, and provided tentative evidence that people prefer either type of incentive (lottery vs. sure payment) over the choice of incentives. Study 2 examined whether participants are more motivated to complete a survey in exchange for a sure cash payment, a lottery, or a choice between a sure cash payment and a lottery. Results from these studies could have important implications for researchers and volunteering organizations, which seek to provide incentives for participants at the lowest cost to the organization.

Can Different Incentives Influence Participants' Choice?

Incentives can motivate people to take actions that they would not otherwise take. There are a variety of different incentives that can motivate people, including social pressure and monetary incentives. This thesis focuses on how different types of monetary incentives influence people's actions. Such an understanding could be useful to organizations that make use of such incentives. For instance, non-profit organizations sometimes offer monetary incentives to help induce people to donate their time, money, or even blood, and an enhanced understanding of the impact of monetary incentives could help to fine-tune such efforts. As another example, researchers often need to motivate people to participate in studies, but usually have limited funds for subject recruitment. Which monetary incentives will people be more likely to respond and act upon? The specific question that this project addresses is whether a fixed sure payment, a lottery with equivalent expected value to the fixed sure payment, or a choice between the sure payment and the lottery, is the most motivating incentive scheme.

Past Studies

Very little prior research has compared the effectiveness of lottery and cash incentives. One study in Australia (Robertson, Walkom, & McGettigan, 2005) examined the effect of giving scratch lottery tickets on the response rates of a nationally mailed questionnaire. In this randomized study, the results showed that the response rate for those receiving an incentive (49.7%) versus not receiving an incentive (40.1%) were significantly different. In short, the study showed that a lottery incentive can motivate people to participate when compared to no incentive at all.

More relevant to the current studies, a randomized trial was conducted in Hong Kong (Leung, Ho, Chan, M Johnston, & Wong, 2002) to examine the effects of cash and lottery

incentives on the response rate to a survey. A total of 4,850 subjects were randomized to one of three conditions: a Control condition with no incentive (n = 1,700), a Cash Payment conditions [three levels of Hong Kong dollars (HKD) $10, $20, and $40; N = 50 in each subgroup], or a Lottery condition (three levels of HKD$1,000, $2,000, and $4,000; N = 1,000 in each subgroup). Incentives were distributed after the survey was completed. The response rate was higher for those offered incentives than for those offered no incentive (19.8% vs. 16.8% respectively). Also, cash was the more effective incentive compared to the lottery (27.3% vs. 19.4% respectively). The expected value of the lottery condition of this study was not mentioned in the paper, which could give reason for a follow-up study in itself. If the cash and lottery condition in this research paper did not have the same expected value, then it would be hard to expect participants to view both incentives the same way, since one incentive would clearly be better than another. In the studies of this paper, both the Sure payment condition and the Lottery condition have equal expected value.

Despite the results of the Hong Kong study, there is reason to think that a lottery might be more motivating than an equal expected-value sure payment. Research on decision making under risk finds that people tend to put disproportionate weight on small probabilities (Kahneman & Tversky, 1979). Overweighting small probability outcomes increases the appeal of lotteries that offer a small probability of winning large prizes. In addition, people are insensitive to the difference between their chances of winning (e.g. 1% chance of winning versus 2% chance of winning) (Kahneman & Tversky, 1979). This line of research may suggest that people would choose a lottery over a sure payment because they put too much weight on their chances of winning the lottery.

Beyond simply comparing lotteries with sure payments, the current studies also sought to compare the motivating effect of each of these incentives offered alone, with the motivating effect of offering a choice between the same incentives. Logically, one should expect a choice to dominate either reward alone, because people have more desirable options when offered a choice. However, several lines of research suggest that this might not be the case. For instance, the "disjunction effect" occurs when decision makers prefer option x over option y when knowing that event A occurs and also when knowing that event A does not occur, but they refuse x (or prefer y) when not knowing whether or not A occurs (Tversky & Shafir, 1992). This could be applied to the current studies because people do not know what to expect under the Choice condition and thus, have more uncertainty when compared to the Sure payment condition or the Lottery condition, where they know which incentive they will receive.

Additional research by Iyengar and Lepper (2000) suggests that too much choice can be de-motivating. Their experiments, which were conducted in both field and laboratory settings, show that people are more likely to purchase gourmet jams or chocolates or to participate in the optional class essay assignments when offered a limited array of 6 choices rather than a more extensive array of 24 or 30 choices. Participants also reported greater satisfaction after the experiment with their selections and wrote better essays when their original set of options was limited. This applies to the current studies because perhaps participants will prefer to have their incentive options limited versus having their choice of incentive options.

A final question that we addressed was this: if lotteries are more motivating than sure payments when they are offered in isolation, do people actually prefer the lotteries over the sure payments when given a choice between the two? Or, do people instead choose sure payments over lotteries when given a direct choice between the two, even if the lotteries are more

motivating in isolation? Again, there is reason to think that individuals' preferences of options offered in isolation are different than their preferences when options are offered jointly.

According to preference reversal research performed by Hsee, Loewenstein, Blount, and Bazerman (1999), joint evaluation (JE) mode can be defined as when a person is presented and evaluates multiple options simultaneously; separate evaluation (SE) mode, in contrast, is when people are presented options one at a time and these options are evaluated in isolation (Hsee, Loewenstein, Blount, & Bazerman, 1999). Counter to general intuition, preference reversals can occur depending on whether alternatives are evaluated jointly or separately. Hsee, Loewenstein, Blount, and Bazerman, explain these JE/SE reversals with the evaluability hypothesis.

The main idea of the evaluability hypothesis is that some attributes are simple to evaluate independently, while other attributes are difficult to evaluate independently. In SE, "easy-to-evaluate" attributes are the most important determinants of individuals' evaluations of the options. However, in JE, people can compare one alternative to another. When comparing alternatives, "difficult-to-evaluate" attributes become easier to evaluate and have greater influence. Whereas "difficult-to-evaluate" alternatives benefit from JE, "easy-to-evaluate" alternatives do not benefit as much, since they are already easy to evaluate under SE. If this shift in impact is large enough, then the result will be a JE/SE reversal (Hsee, Loewenstein, Blount, & Bazerman, 1999).

One potential reason people may shift preferences between JE and SE in the current two studies is because when cash and lottery are presented in JE, the risk of the lottery is very salient and easy to compare to the lack of risk involved in the sure payment option. In SE, however, the risk is less salient and other, easier to evaluate, attributes that favor the lottery are more salient (e.g., maximum earnings). The current studies attempted to answer three questions. First, which

monetary incentives of equal expected value will people be more likely to respond and act upon? Should participants be offered more incentive choices or is it better to only offer one incentive? Finally, can a JE/SE reversal occur with different incentives depending on how easy or how hard they are to evaluate? We hypothesize that under SE, people will be more likely to participate under the Lottery condition versus the Sure payment condition. On the other hand, under JE or the Choice condition, people will be more likely to choose the Sure payment condition over the Lottery condition because it becomes for salient that the lottery has a lot more risk when compared to a sure payment.

Study 1: Blood Donations

Method

Participants

3311 university students were sent one of four different e-mails about an upcoming campus blood drive four days before the blood drive took place. Forty-six people (21 females, 25 males) showed up to donate at the blood drive.

Procedure

Participants were randomly assigned to one of four conditions. The four conditions corresponded to four different e-mail messages publicizing the drive (see Appendix A). The first message served as a control and simply described information about the upcoming drive. The second described the drive and offered a $5 Amazon.com gift certificate for those who came to the drive to give blood. The third message offered a lottery for an Amazon.com gift certificate with an expected value of $5 for those who came to the drive to give blood. The fourth message offered a choice between either the $5 gift certificate or the lottery described above to those who

came to give blood. All messages that included incentives indicated that incentives would be received at the blood drive.

The blood drive took place on the Carnegie Mellon campus. After individuals gave blood or finished a screening procedure that determined they were ineligible to donate that day, they were invited to visit a separate table in the room and receive an incentive. When people visited this table, researchers looked up participants' ID codes to see what (if any) e-mail they received. If they received $5 gift certificate e-mail, we gave them an Amazon.com gift certificate in that amount. If they received a lottery email, we had participants choose a number between 0 and 9 and that number was entered on a website called Random.org. Random.org then selected a number between 0 and 99. If the participant's chosen digit appeared once in the number that was generated, they received a $10 Amazon.com gift certificate. If the participant's chosen number appeared twice in the number that was generated, they received a $300 Amazon.com gift certificate. If participants received a choice email, a control condition email, or did not receive an email from this study, they chose between either receiving a $5 Amazon.com gift certificate or playing the lottery. In sum, all people who showed up to donate were given an incentive opportunity, and if they did not have a previously assigned incentive, they were given their choice between incentives.

Study 1: Results

As the below table shows, people in the Five-dollar gift certificate condition (or in other words the "Sure payment" condition) were significantly more likely to show up to donate blood than were those in the control condition, (1.78% vs. 0.59%, respectively). Specifically, being in the Five-dollar gift certificate condition compared to the control condition led to an increase in the odds of showing up to donate of 4.01, Wald $\chi 2$ ($df = 1$, N=3311) = 4.62, $p = 0.03$. Similarly,

people in the Lottery condition were significantly more likely to show up to donate blood than were those in the Control condition, (1.98% vs. 0.59%, respectively). Being in the Lottery condition compared to the Control condition led to an increase in the odds of showing up to donate of 4.45, Wald $\chi 2$ ($df = 1$, N=3311) = 5.38, $p = 0.02$. In contrast, people in the Choice condition were not significantly more likely to show up to donate blood than were those in the Control condition (0.81% vs. 0.59%, respectively). Being in the Choice condition compared to the Control condition led to no significant increase in the odds of showing up to donate, Wald $\chi 2$ ($df = 1$, N=3311) = 1.42, $p = 0.23$.

	Control	**$5**	**Lottery**	**Choice**	**Other**
# who donated	0.59% (5)	1.78% (15)	1.98% (15)	0.81% (7)	15
Total # who received message	841	845	759	865	N/A

Twenty-three participants chose between the five-dollar gift certificate and the lottery in this study, as can be seen in the table below. Participants did not prefer either incentive at a level other than chance (χ^2 (1, N = 23) = 0.043, $p = 0.835$).

	$5	Lottery
Control	1	2
Choice	3	2
Other	8	7
TOTAL	**52.2% (12)**	**47.8% (11)**

Study 1: Discussion

The results were consistent with the hypothesis that respondents would prefer to be offered one incentive versus the choice between two incentives. This study did not indicate which incentive participants were more likely to choose in the Choice condition, but this could be due to many factors, including the small sample size.

Study 2: University Libraries

Method

Participants

139 participants (80 females, 59 males) at University of Pittsburgh and Duquesne University libraries served as participants.

Procedure

People were randomly assigned to one of four conditions before being asked to take a survey. Once they were assigned to a condition, they were they were approached by one of two experimenters at either the Duquesne library or the Cathedral of Learning and asked to take a survey in exchange for an incentive. The experimenters used pre-determined scripts for each condition to ensure that participants were asked to participate in a consistent manner (see Appendix A). Experimenters recorded the gender of the participant and whether or not participants agreed to take the survey.

The first condition was the Control condition in which people were not offered an incentive, but were simply asked to take a five-minute survey. The second condition offered $3 for taking the survey. The third condition offered a lottery with a 20% chance to win $10 and a 1% chance to win $100 for taking the survey. Participants in this condition chose a number between 0 and 9 and were allowed to roll a pair of 10-sided dice. If one die showed the participant's chosen number, that participant received $10. If both dice showed the participant's chosen number, that participant received $100. The fourth condition was a Choice condition in which participants chose to receive $3 or play the lottery described above.

Participants who did not agree to take the survey were thanked for their time. Participants who agreed to take the survey and who were in the Choice condition first made a choice about which incentive they preferred. Then, all participants who agreed to take the survey completed an unrelated survey about privacy, received their incentive, and signed a receipt. After Choice condition participants signed their receipt or played the lottery and did not win, they were asked why they chose one incentive over the other. Their responses were recorded by the experimenter.

Study 2: Results

Forty-eight participants chose between $3 and playing the lottery in this study. Consistent with one of the study's hypotheses, participants significantly preferred the sure payment option (72.3%) over the lottery option (27.7%), χ^2 (1, N = 48) = 10.083, p = 0.01.

	$3	**Lottery**
Choice	72.3% (34)	27.7% (13)

Also, as the below table shows, there were no statistically significant participation differences among conditions in study 2 (all p's >0.48). Specifically, being in the $3 condition (or in other words, the "Sure payment condition") compared to the Control condition did not lead to any differences in the decision to participate, 74.1% vs. 81.5%, respectively Wald $\chi2$ (df = 1, N = 139) = .43, p = 0.51. Being in the Lottery condition compared to the Control condition also did not lead to any differences in the decision to participate, 88.5% vs. 81.5%, respectively Wald $\chi2$ (df = 1, N = 139) = .50, p = 0.48. Additionally, being in the Lottery condition compared to the Control condition did not lead to any differences in the decision to participate, 81.4% vs. 81.5%, respectively Wald $\chi2$ (df = 1, N = 139) = 0, p = 0.99.

	Control	$3	Lottery	Choice
Participated	81.5% (22)	74.1% (20)	88.5% (23)	81.4% (48)
Did not Participate	18.5% (5)	25.9% (7)	11.5% (3)	18.6% (11)

Study 2: Discussion

As predicted, participants from the Choice condition preferred the sure-cash payment versus a lottery that had the same expected value. We also observed directional support for the hypothesis that participants would be most likely to participate when offered a lottery incentive versus other incentives, including a sure payment incentive. However, there was no support for the prediction that participants would be more likely to participate if given an individual incentive than if given a choice between two incentives.

General Discussion

Results from these studies supported our original hypothesis, although some of the findings were not statistically significant. In Study 1, we saw evidence that participants were more likely to participate when given one incentive option versus having the choice between incentive options. In study 2, we observed that people were more likely to choose the sure-cash

payment over the lottery in the Choice condition even though they were (non-significantly) more likely to participate in the Lottery condition over the Sure payment condition.

Why did we observe different patterns of results across the two studies? One possibility is that giving out cash (study 2) versus an Amazon.com gift certificate (study 1) produced a difference in results for whether lotteries or cash are preferred in a direct choice. In study 1, transaction costs involved with using a gift certificate may have made the small sure-payment gift certificate less appealing compared to the lottery than if cash had been used. Another possibility for the difference in participation results between studies is how people were solicited for participation. In study 1, people were asked over e-mail. In study 2, they were asked in person. Because it is generally hard to say no in person, we may have lost differences in participation due to the solicitation in study 2.

Two important differences between study 2 and study 1 were the different student populations and the task that participants were asked to perform for the given incentives. In study 1, participants were recruited only from Carnegie Mellon University and were asked via email to donate blood at the University Center at a one-day blood drive. In study 2, participants were approached by experimenters at the Duquesne University library and the Cathedral of Learning (where many University of Pittsburgh students study) and asked if they could take a five-minute survey right then. It took more effort for Carnegie Mellon students to go down to the University Center and donate blood (which can take an hour or more) versus taking a survey (which took around 5 minutes) at a library without having to go anywhere. This could account for some of the differences in results because the more effort and time a task takes, the less likely people will be motivated to accept the incentive for their time.

Follow-up studies are being performed to further test the hypothesis. Another blood drive experiment, like in study 1, will be performed to collect more data. From another blood drive, we would be hoping to see similar results as we found in the first study: higher respondent rates for the Lottery condition and Sure-payment condition compared to the Choice condition. We would need more participants to determine if our results from this paper's blood drive study are statistically significant. In addition, another library study is currently being performed. The new library study will have one procedural difference from the last library study. The difference is that participants are being told that the experiment will take 10-15 minutes instead of 5 minutes. This will add effort to the library study to see if we get the same results as we found in study 2. The final follow-up study that we want to perform is a Greyhound bus station experiment. This study would be similar to study 2 except participants would be told more about the lottery, instead of just hearing the probabilities of winning the lottery. For instance, they would be given more information about how the lottery is played. This would, as a result, reduce uncertainty under the Lottery condition.

Overall, we found convincing evidence that when a person is offered one incentive, then the lottery would be the better incentive to use because it had the highest response rate (non-significantly) in both conditions. Participants did not seem to prefer to be given the choice of incentives, but when they did participate under the Choice condition, they usually picked the sure payment over the lottery, which is a preference reversal. This means that it depends on if people are evaluating the choice to participate based upon joint or separate evaluation. If volunteering organizations or research institutions wanted people to do a volunteering task, like donating blood or taking a survey, then they would have higher participation rates if they only offered the Lottery condition incentive versus the Sure-payment condition incentive. If, however, the

volunteering organizations or research institutes wanted to offer two incentives, people would be more likely to pick a sure-payment when compared to a lottery. Researchers, volunteering organizations, and non-profit organizations in general would benefit from knowing that preference reversals can and do happen when it comes to monetary incentives that are designed to motivate action.

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Appendix A

The Blood Drive Study E-mail Messages

Message 1: Control Condition

Title: Important CMU Blood Drive

Dear Carnegie Mellon Students,

Central Blood Bank is holding an urgent blood drive this Monday February 19. The recent severe winter weather and higher-than-expected transfusions in January have greatly reduced blood inventory and may soon impact the delivery of health care to the region. Blood donors of all types are needed to donate as soon as possible.

The blood drive will be from 9:00 a.m.-3:30 p.m. in the University Center Connan Room. If you would like to donate, please send an e-mail to DBova@itxm.org with your name and preferred donation time to make an appointment, or, you can walk-in during the day of the drive.

Message 2: Sure Payment Condition

Title: Important CMU Blood Drive: Special Reward

Dear Carnegie Mellon Students,

Central Blood Bank is holding an urgent blood drive this Monday February 19. The recent severe winter weather and higher-than-expected transfusions in January have greatly reduced blood inventory and may soon impact the delivery of health care to the region. Blood donors of all types are needed to donate as soon as possible.

Because of this unique situation, Carnegie Mellon is offering a special incentive to students who donate. If you donate blood at the drive on February 19, you will receive $5*.

The blood drive will be from 9:00 a.m.-3:30 p.m. in the University Center Connan Room. If you would like to donate, please send an e-mail to DBova@itxm.org with your name and preferred donation time to make an appointment, or, you can walk-in during the day of the drive.

*The incentive will be in the form of an Amazon.com gift card because we are legally prohibited from giving cash.

Message 3: Lottery Condition

Title: Important CMU Blood Drive: Special Reward

Dear Carnegie Mellon Students,

Central Blood Bank is holding an urgent blood drive this Monday February 19. The recent severe winter weather and higher-than-expected transfusions in January have greatly reduced blood inventory and may soon impact the delivery of health care to the region. Blood donors of all types are needed to donate as soon as possible.

Because of this unique situation, Carnegie Mellon is offering a special incentive to students who donate. If you donate blood at the drive on February 19, you will be entered in a lottery with a 20% chance to win $10* (two out of every ten donors will win!) and a 1% chance to win $300. (You will receive the incentive at the blood drive).

The blood drive will be from 9:00 a.m.-3:30 p.m. in the University Center Connan Room. If you would like to donate, please send an e-mail to DBova@itxm.org with your name and preferred donation time to make an appointment, or, you can walk-in during the day of the drive.

*The incentives will be in the form of an Amazon.com gift card because we are legally prohibited from giving cash.

Message 4: Choice Condition

Title: Important CMU Blood Drive: Special Reward

Dear Carnegie Mellon Students,

Central Blood Bank is holding an urgent blood drive this Monday February 19. The recent severe winter weather and higher-than-expected transfusions in January have greatly reduced blood inventory and may soon impact the delivery of health care to the region. Blood donors of all types are needed to donate as soon as possible.

Because of this unique situation, Carnegie Mellon is offering a special incentive to students who donate. If you donate blood at the drive on February 19, you will receive your choice of two incentives. The first incentive is $5*. The second incentive is a lottery with a 20% chance to win $10 (two out of every ten donors will win!) and a 1% chance to win $300. (You will receive the incentive of your choice at the blood drive).

The blood drive will be from 9:00 a.m.-3:30 p.m. in the University Center Connan Room. If you would like to donate, please send an e-mail to DBova@itxm.org with your name and preferred donation time to make an appointment, or, you can walk-in during the day of the drive.

*The incentives will be in the form of an Amazon.com gift card because we are legally prohibited from giving cash.

Library Study Condition Scripts

Control Condition

Hi, my name is ____, and I am a student at Carnegie Mellon University collecting data for a class. Would you be willing to take a quick 5-minute survey?

Did the participant take the survey? Yes No
Gender: Male Female
Additional Notes:

$3 Condition

Hi, my name is ____, and I am a student at Carnegie Mellon University trying to collect data for a class. If you take a quick survey, you will receive $3. Would you be willing to take a 5-minute survey?

Did the participant take the survey? Yes No
Gender: Male Female
Additional Notes:

Lottery Condition

Hi, my name is ____, and I am a student at Carnegie Mellon University trying to collect data for a class.

If you take a quick survey, you will play a lottery that gives you a 20% chance to win $10 and a 1% chance to win $100.

Would you be willing to take a 5-minute survey?

Did the participant take the survey? Yes No
Gender: Male Female
Additional Notes:

Choice Condition

Hi, my name is ____, and I am a student at Carnegie Mellon University trying to collect data for a class.

If you take a quick survey, you will receive your choice of incentives. You can either receive $3 OR you can play a lottery that gives you a 20% chance to win $10 and a 1% chance to win $100. **Would you be willing to take a 5-minute survey?**

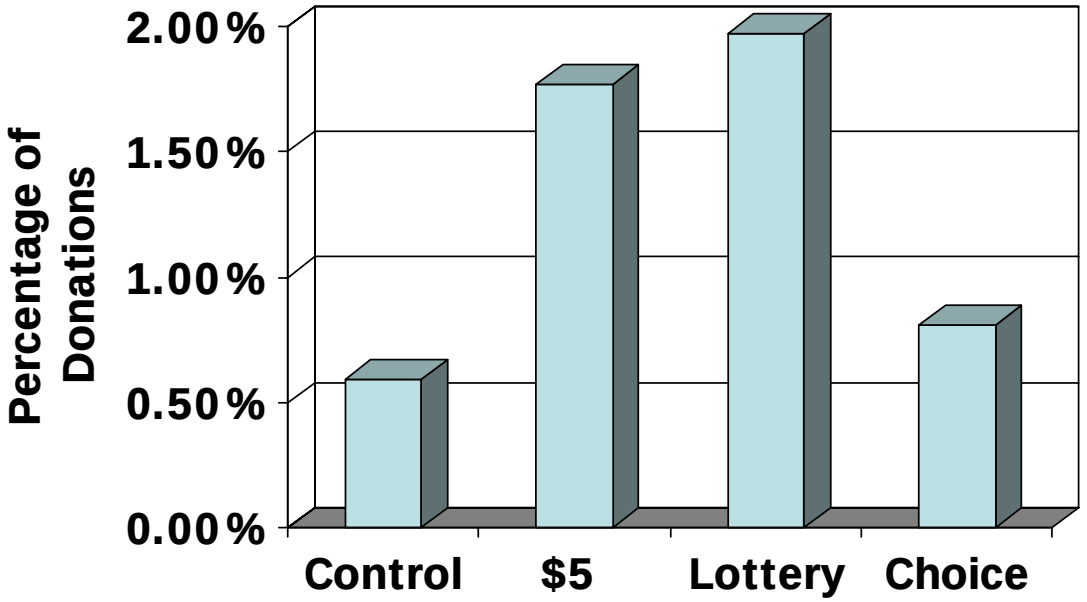
If they say he/she will take the survey:
Would you prefer the $3 or the lottery?

Did the participant take the survey? Yes No
Which incentive did he/she pick? L $3 N/A
Gender: Male Female
Additional Notes:

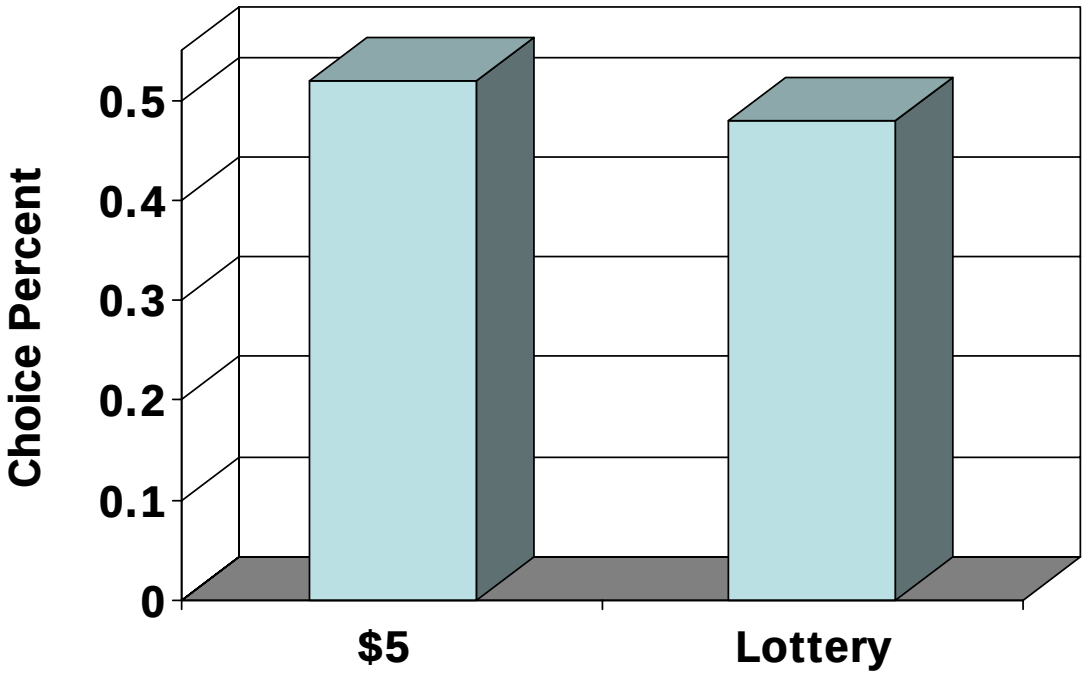
After he/she takes the survey:
One final question: Why did you choose the [$3/Lottery] over the other incentive?

Appendix B

Blood Drive Graphs

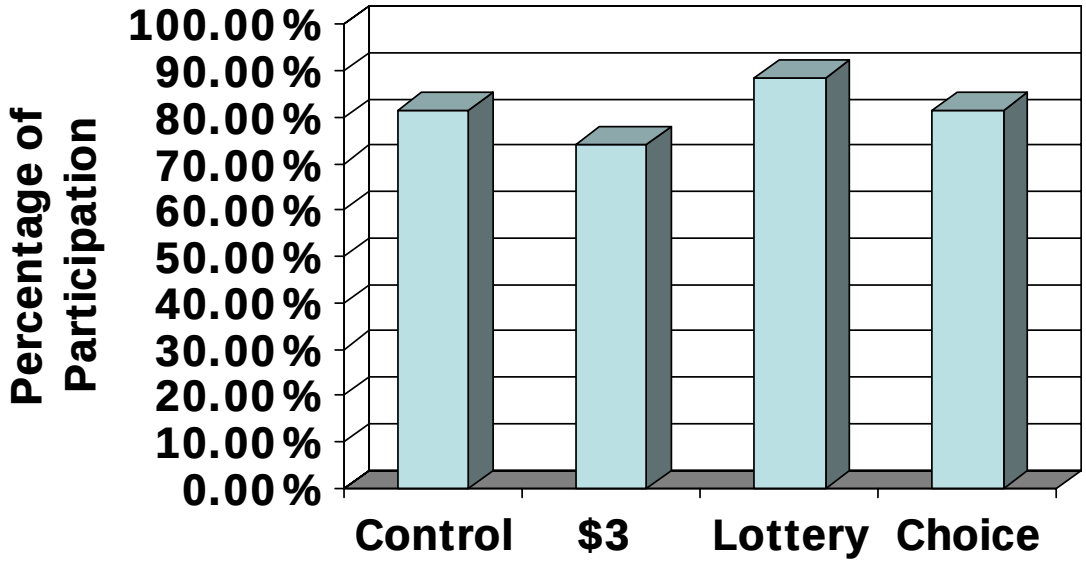


Graph 1: Percentage who donated by Condition

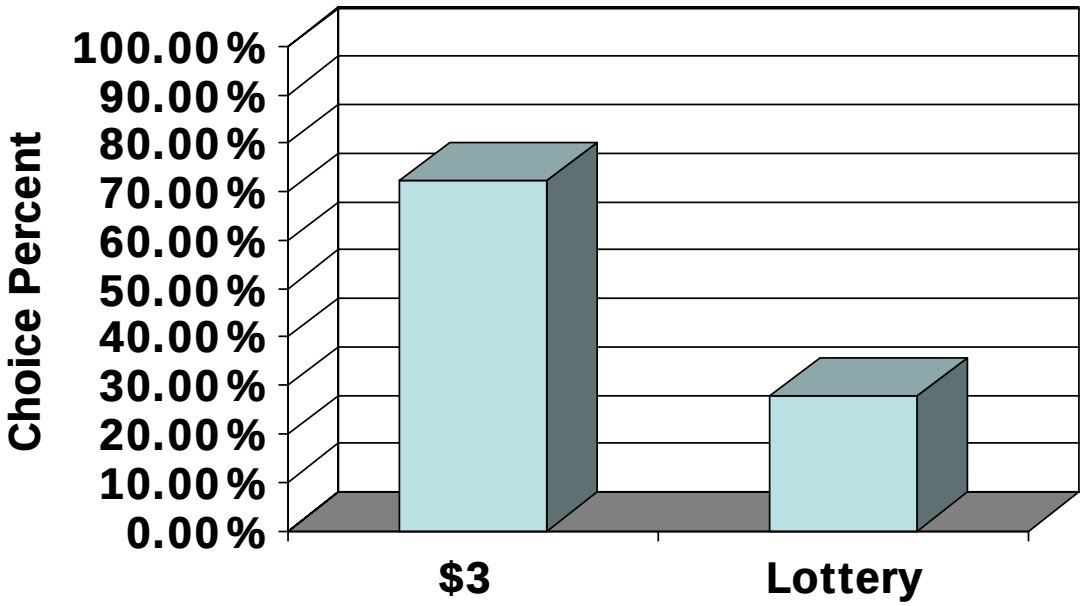


Graph 2: How many participants chose $5 versus the lottery?

Library Graphs



Graph 3: Number who donated by Condition



Graph 4: How many participants chose $3 versus the lottery?