Look Me in the Eyes: Examining the Effects of Priming with Eyes on Deception

Christopher Traver
Cornell University
cjt84@cornell.edu

Tyler Cordell
Cornell University
trc74@cornell.edu

ABSTRACT
Money can go a long way when it comes to decision-making. Prior work has demonstrated that if being deceptive provides more money than being honest, more lies will be told on average compared to if lying had no benefit. However, if people think that they are being watched, are they less likely to be deceptive? This paper aims to reveal whether or not eye priming has any effect on levels and frequency of deceptiveness online in incentivized tasks. 405 participants were asked randomly to either roll a dice and report the number rolled or flip a coin six times and report the number of heads; the participants were simultaneously exposed to either an image of eyes or an image of flowers. In all conditions, participants were offered a higher amount of money for a higher reported result. Results show that participants who were exposed to an image of a pair of eyes displayed less deception than those participants who were not exposed to any such images during the same task involving incentivization. It was also found that participants randomly assigned to the coin task displayed less deception than participants assigned to the die task.

Author Keywords
Priming, incentivization, deception, eyes

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI)

INTRODUCTION AND BACKGROUND

Deception is encountered by human beings on a daily basis, and if gone undetected, can do severe damage to the social norms that are crucial to the way that society functions [6]. One of the major factors that plays into deception which we have decided to focus our study on is incentivization. Research has shown that if being deceptive will provide more benefit than being honest, more lies will be told on average compared to if lying had no benefit [5]. However, if people think that they are being watched, and thus have a chance to be caught, they are less likely to be deceptive [3]. One example of this is cheating on online exams where students are often incentivized by higher grades to use restricted resources. If students feel the chances of getting caught are low, they may choose to be deceptive in order to get they highest grade possible. However, what would happen if the same students are exposed to a photograph of eyes or something that gave them the perception that they were being watched while taking the exam? Would the presence of eyes affect their honesty on average, and would they be less likely to cheat if they simply had the perception that they were being watched? If it is found that perceptions can affect deception, this could unlock a new realm of possibilities in increasing honesty and reducing cheating.

Dan Ariely found that incentivization increased deceptiveness, yet only up to a certain amount. In his matrix experiments, participants were rewarded 50 cents for each correct answer they provided in a matrix challenge. Participants reported two more correct matrices out of twenty in the condition where they self-reported their answers, as compared to when an experimenter checked the participants' answers [2]. To see if cheating increased with increased incentives, Ariely offered varied amounts per question, ranging from $1 to $10, and discovered that people still added approximately two questions to their score regardless of their payment. Ariely goes on to say that people generally want to think of themselves as honest, and therefore they avoid high levels of deception to avoid any resulting cognitive dissonance. By being slightly deceptive and adding just two questions in the matrix experiment, people allow themselves to avoid experiencing this cognitive dissonance [2].

In addition to incentivization, our behaviors and deceptiveness are often influenced by our external environment and the cues around us [4]. Automaticity research looks at the way that exposure to primes influences people's social behavior [5], and according to Bargh, "primes are unconscious activation of social knowledge structures" that affect social behavior [3]. An example of priming can be found in an experiment conducted by Aarts and Dijksterhuis. The study found that when participants were primed with images of a library, they were more likely to speak more quietly. The researchers interpreted these results as participants exhibiting normative behavior of speaking quietly in libraries as a result of their being primed with the library images [1]. According to Spottswood, presence of eye primes can also "nudge" people toward normative behaviors, which are behaviors that are generally acceptable in society [5]. As a result, eye primes have been shown to increase adherence to contextual cues and increase accuracy of disclosed information. Essentially, the perception of being watched can influence people to provide more accurate information and be less deceptive.

This topic is of interest to the CHI community because if it is found that monitoring perceptions can affect deception, this may potentially lead to increased honesty in online testing and more accurate disclosures in a wide range of areas such as social networks, dating profiles, and surveys. For example, on social networks, users are incentivized to lie in order to gain more friends, and on dating profiles, users are incentivized to lie to gain more dates. If we can better understand the role that monitoring perceptions play on deception then we can redesign these platforms to encourage more honesty.

THE EXPERIMENT

This study aims to investigate the effects of eye priming on deception in incentivized tasks. While priming may increase accuracy of disclosed information, it is necessary to investigate its potential effects on direct deception with no variables other than the presence or absence of eyes on a statistically significant sample. In our experiment, an inaccurate reporting of information will be a good test of deception because participants will be blatantly lying if they choose to be deceptive. To examine this question of whether having the perception of being observed affects deceptiveness during incentivization, we plan to conduct an experiment where participants will be randomly assigned one of the two tasks: flipping a coin six times or rolling a die once. Participants will then report either the number of heads flipped or the number on the face of the die. While completing these tasks, participants will either be presented with an image containing eyes, or an image without eyes, such as flowers as pictured in Figure 1 below. Participants will receive a small cash reward for simply participating, and will receive an additional cash prize for every number that they report. A participant who inaccurately reports the number on the die they roll or the number of heads they flip will be directly choosing to be deceptive to gain a higher reward. We first hypothesize that participants in all conditions will be slightly deceptive in order to gain a small benefit without risking detection. We next hypothesize that participants exposed to eye primes will be less deceptive than those not exposed to eye primes. We finally hypothesize that participants will be less deceptive when flipping the coin because they have to flip it six times. Compared to completing a task once, we believe that repeating a task decreases the chances of further lying after each trial.

Figure 1. Pictures presented in the Qualtrics survey.

Participants. Participants were recruited through the Amazon Mechanical Turk system. There were 405 participants who took part in the study. Of the 405 participants, 265 were male, 135 were female and 5 preferred not to say, ranging from age 18 to over 65. According to the survey the participants filled out, 67.41% of participants were White/Caucasian, 3.21% were African American, 18.77% were Asian, 4.94% were Hispanic, and 4.44% were of other decent.

Procedure. Each participant was randomly assigned to either a control group or an experimental group. The experimental group was exposed to an image of eyes looking directly at them on the top of their survey so that the participant could see the eyes while they completed the task. The control group was exposed to an image of flowers instead in the same place. Participants were then randomly assigned to complete one of two tasks: rolling a six-face die once, or flipping a coin six times. Participants were allowed to use any means to accomplish their task, and were able to choose to flip a physical coin, roll real die, or use external websites with virtual coin flipping and die rolling capabilities to do so instead. This assured that participants had privacy while completing the task, which gave them the feeling that their rolls or flips were not being recorded. This is important because if they felt they were being recorded, they may have felt more inclined to be honest in their reporting. After finishing their tasks, the coin participants were asked to report the total number of heads out of 6 flips, and the die participants were asked to report the number on the top face of their die.

Data Analysis. Once all of the data from participants' tasks was recorded and stored into our database, we compared it to a normal distribution of values for coin flips and die rolls. We did this in order to determine the rate of deception participants exhibited compared to the expected outcomes of each value according to a normal distribution. We then compared participants' rates of deception to whether or not they were exposed to a picture of eyes or no eyes while they were completing their task in order to determine the effect that eye priming had on levels of deception while completing the task.

RESULTS

Out of the 405 participants, 102 completed the coin with eyes task, 102 completed the die with eyes task, 101 completed the coin with no eyes task, and 100 completed the die with no eyes task.

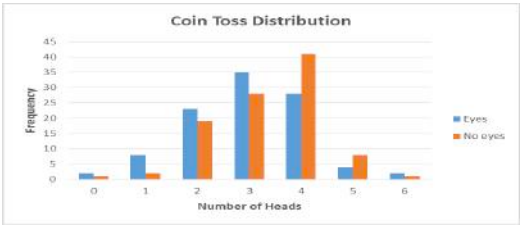

Figure 2. Distribution of coin tosses.

In the distribution of coin flips pictured in Figure 2 above, the expected mode was three. 41 participants who were in

the control group reported four out of six heads compared to 28 participants who were in the experimental group. The mode for the control group was four, while the mode for the experimental group mode was three.

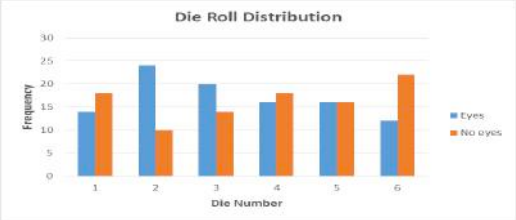

Figure 3. Distribution of die rolls.

In the distribution of die rolls pictured in Figure 3 above, we expected to see a uniform distribution. The mode for the control group was six while the mode for the experimental group was two.

	$\bar{X}$	μ	σ_{sample}	$\sigma_{expected}$
Eyes + Die	3.314	3.500	1.598	1.708
No Eyes + Die	3.714	3.500	1.793	1.708
Eyes + Coins	2.971	3.000	1.156	1.225
No Eyes + Coins	3.340	3.000	1.037	1.225

Figure 4. Sample and expected means and standard deviations for all conditions.

For the die with eyes condition, the sample mean ($\bar{X}$) was lower than the expected mean (μ) of an unbiased die by 1.10 standard deviations [p-value=0.136]. For the die without eyes condition, the sample mean ($\bar{X}$) was greater by 1.27 standard deviations [p-value=0.102]. The difference of the expected means was 0.40 and resulted in a p-value of 0.0465 which assuming α=0.05, suggests that deception was present. P-values were calculated assuming normally distributed sample means by the Central Limit Theorem.

For the coins with eyes condition, the sample mean ($\bar{X}$) was almost equal to the expected mean (μ). For the coins without eyes, the mean was larger by 2.81 standard deviations [p-value=0.0025]. The difference of expected means was 0.37 and resulted in a p-value of 0.015, which strongly suggests that deception was present.

Hypotheses

Our first hypothesis expected participants assigned to experimental group to report lower results than those in the control group. The hypothesis was supported as participants in the die control group reported a mean of 3.714 versus a mean of 3.314 in the die experimental group. The same was observed in the coin control group where participants reported a mean of 3.340 versus a mean of 2.971 in the coin experimental group.

Our second hypothesis expected that participants would report slightly higher than average results in all conditions. This hypothesis was not supported, as both control groups reported higher than expected means while both experimental groups reported lower than expected means. We believe that there may be participants who did not actually complete our task, and the eye primes variable influenced their fake reported number. Participants in the control groups may have freely reported high numbers due to lack of eye primes while participants in the experimental groups were influenced to report lower numbers due to the presence of eye primes.

Our third hypothesis that participants in the coin conditions would report lower results than those in the die conditions was not supported. The reported results show that differences in sample means in both conditions were 0.4, but the difference in the coin condition was more statistically significant because it had a lower expected standard deviation.

Race

In the die conditions, each race reported the following sample mean values (μ=3.5): White/Caucasian $\bar{X}$=3.7, African American $\bar{X}$=3.7, Hispanic $\bar{X}$=2.7, Asian $\bar{X}$=3.3, Other $\bar{X}$=3.4. The results reveal that the White/Caucasian and African American demographics reported a higher sample mean than expected, while the Hispanic, Asian, and Other demographics reported a lower sample mean than expected.

For the coin conditions, each race reported the following sample mean values (μ=3.0): White/Caucasian $\bar{X}$=3.1, African American $\bar{X}$=2.0, Hispanic $\bar{X}$=2.9, Asian $\bar{X}$=3.4, Other $\bar{X}$=3.2. The results reveal that the White/Caucasian Asian, and Other demographics reported a higher sample mean than expected, while the African American and Hispanic demographics reported a lower sample mean than expected.

Gender and Age

In the die conditions, each gender reported the following sample mean values (μ=3.5): Females $\bar{X}$=3.68 and Males $\bar{X}$=3.44. The results reveal that the Female participants reported a higher sample mean than expected, while the Male participants reported a lower sample mean than expected.

In the coin conditions, each gender reported the following sample mean values (μ=3.0): Females $\bar{X}$=3.03 and Males $\bar{X}$=3.20. The results reveal that the all participants regardless of gender reported a higher sample mean than expected.

In the die conditions, each age demographic reported the following sample mean values (μ=3.5): 18-25 year olds $\bar{X}$=3.7, 26-34 year olds $\bar{X}$=3.5, 35-54 year olds $\bar{X}$=3.5, over 55 year olds $\bar{X}$=3.1. The results reveal that 18-25 year olds reported a higher sample mean than expected, 26-34

and 35-54 year olds reported expected results while over 55 year olds reported a lower sample mean than expected.

In the coin conditions, each age demographic reported the following sample mean values (μ=3.0): 18-25 year olds $\bar{X}$=3.5, 26-34 year olds $\bar{X}$=3.0, 35-54 year olds $\bar{X}$=3.4, over 55 year olds $\bar{X}$=2.8. These results show that 18-25 and 35-54 year olds reported a higher sample mean than expected, 26-34 year olds reported expected results while over 55 year olds reported a lower sample mean than expected.

DISCUSSION

The purpose of this study was to examine the effect of eye priming and incentivization on deception. Our findings are consistent with those of Ariely's matrix experiment where participants were seen being deceptive but only by a small amount in an attempt to not be noticed and minimize cognitive dissonance [2]. In our study, we found that presence of eye primes in incentivized tasks decreases levels of deception up to 7%. We believe this to be true because the average reported number for die rolls increased by 0.4 between the control and experimental conditions, where the only variable was presence of eye primes.

Further analyzing our data across different races, we found the Hispanic demographic to be the least deceptive among all race demographics, with a sample mean of 2.7 versus an expected mean of 3.5 in the die condition and a sample mean of 2.9 versus an expected mean of 3.0 in coin condition. Prior research does not provide clear results about the level of dishonesty prevalent in the different cultures across America, so this should be revisited in future research.

Analysis of age demographics in our study led to interesting findings. The 18-25 year old demographic was seen to be the most deceptive, reporting a sample mean of 3.7 against expected sample mean of 3.5 in the die condition and a sample mean of 3.5 against the expected mean of 3.0 in the coin condition. On the contrary, the over 55 year old demographic was least deceptive, reporting a sample mean of 3.1 against the expected mean of 3.5 in die condition and a sample mean of 2.8 against the expected mean of 3.0 in coin condition. In other words, our results show a clear trend that older people are less deceptive than younger people. This could be because the younger generation is less of a stickler for scrupulous and ethical behavior, or older mature people need more incentive to violate their default truth bias [6].

Implications and limitations

The results of this study suggest that presence of eye primes can be effective at decreasing deception. It is important to note that deception is not limited to any location, platform, or demographic but is rather an issue that affects the human population as a whole. The results of this study therefore have important implications for any person attempting to decrease deceptiveness in situations where individuals have an incentive to be dishonest.

These findings on deception could be particularly important in the context of cheating via self-reporting (ex. taxes, résumés, or exams). The study finding that 18-25 year olds display the highest levels of deception could be the motive behind using eye primes in college settings. If eye primes could be used to decrease levels of dishonesty on college campuses, it might lead to an increase in the overall integrity of societies that students will join in the future.

The key limitations of this study are related to sample size and monetary restrictions. Due to time restrictions during data collection, the sample population was not large enough to draw statistically significant conclusions about differences in deception across gender or race. Our team also suspects that the incentivization amount may have been too low to encourage deception in some of our participants.

Future Research

As future research our team would like to see an expansion of the current study with an inclusion of additional variables such as varying compensation amounts and types of eye primes. By varying the amount of additional compensation that participants receive based upon their results, we could test if higher incentives lead to higher levels of deception. It would be particularly interesting to see where the threshold lies for individuals to consider cost of deception over monetary gain. Our team would also like to investigate how with the use of more discreet eye primes (ex. a human face), multiple eye primes (ex. a group of researchers), and non-human eye primes (ex. cat eyes) deception could be affected.

REFERENCES

1. Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, situational norm, and social behavior. *Journal of Personality and Social Psychology, 84*, 18-28.
2. Ariely, D. (2012). Testing the simple model of rational crime (SMORC). In *The (honest) truth about dishonesty: How we lie to everyone--especially ourselves*. New York City: Harper
3. Bargh, J. A. (2006). What have we been priming all these years? On the development, mechanisms, and ecology of nonconscious social behavior. *European Journal of Social Psychology, 36*, 147-168.
4. Joly, J. F., Stapel, D. A., Lindenberg, S. M. (2008). Silence and table manners: When environments activate norms. *Personality and Social Psychology Bulletin, 34*, 1047-1056.
5. Spottswood, E. (2014). *Nudging Privacy*. Unpublished doctoral dissertation, Cornell University.
6. Vrij, A., & Baxter, M. (1999). Accuracy and confidence in detecting truths andlies in elaborations and denials: Truth bias, lie bias and individual differences. Expert evidence, 7(1), 25-36.