

EXPLORING OBSERVATION AS A NUDGE TO INFORM ECONOMIC
THEORIES ABOUT PROSOCIAL DECISION-MAKING

RUHANI WALIA
Principal Investigator

ROBERT S. GAZZALE
Faculty Advisor

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University of Toronto
Department of Economics
Laidlaw Scholars Leadership and Research Programme

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Abstract

A commonly cited phenomenon in the field of behavioural economics and prosocial behaviour is that if one is aware that their decisions are being observed, they are more likely to make the socially preferred choice. This paper reports on a laboratory experiment that explores what facets of observation are most influential with a focus on imminency and individuation. Participants complete four economic decision-making activities, two of which test for prosocial behaviour, under varying types of observation. It is found that the removal of anonymity, that is, the addition of individuation, has a significant impact on prosocial behaviour. This confirms previous findings in the field of the impact of anonymity on generosity in economic activities. Interesting differences are found between the baseline and treatment groups where observation is added. The data show that the upper limit of offers made in the dictator game under all treatments where observation was added is consistently higher than the baseline. The data also suggest that a lack of observation and the maintenance of anonymity is correlated with stronger attitudes towards inequity aversion, although no significant differences were found across treatments. It is also found that the highest and lowest offers made across all treatments are under both webcam-based treatments.

Keywords: prosocial behaviour, decision-making, behavioural economics, experimental economics

1 INTRODUCTION

A widely understood concept in the field of behavioural economics is nudge theory. Developed by Richard Thaler and Cass Sunstein, it predicts outcomes that are highly correlated with context, explaining how an environmental feature can influence our decisions.¹ Building on heuristics

research by Daniel Kahneman and Amos Tversky,² nudge theory was initially developed as an ethical concept to improve society. However, firms have found ways to use it for profit maximization, such as including nudges in advertisements.³

Contrastingly, this research paper focuses on how nudge theory may minimize resistance and maximize positive change using social normative influences. Existing literature suggests that if one is aware that their decisions are being observed, they are more likely to make the socially preferred choice. For example, people receiving tax reminders in the UK were shown the phrase: "9 out of 10 people in your area are up to date with tax payments." This increased tax payments by 15% in comparison to other areas.⁴

Further exploration of this concept may lead one to wonder what facets of observation are most influential. As such, this research aims to study how observation might act as an effective nudge toward prosocial behaviour. Importantly, prosocial behaviour is defined as any voluntary action that is intended to benefit others, such as cooperating, donating, or sharing.⁵

I am curious about if the desire to "fit in" depends on the type of scrutiny that one receives. Specifically, I aim to test the impact of (1) adding observation and (2) removing anonymity (by adding linkability). To further explore the former, three types of observation are tested: live streaming choices, recording choices and having subjects say their choices aloud. The treatment groups are thus named: (1) C for Control, (2) NO;NA for No Observation, No Anonymity, (3) YO;NA;IP for Yes Observation, No Anonymity, and In-Person, (4) YO;NA;L for Yes Observation, No Anonymity, Livestream, and (5) YO;NA;R for Yes Observation, No Anonymity, Recorded.

Testing these may clarify whether imminency or individuation, two dimensions of observation, is most influential. In the real world, this may translate to a better understanding of the influence of observation as used by the government, during proctored exams, in online school, and several other contexts.

Additionally, this paper aims to contribute to the broader discussion on the importance of considering irrationality in economic models – something which is often overlooked in the neoclassical school. Ideally, the findings of this research will act as promising preliminary evidence to necessitate further research on observation as a form of nudge.

Ultimately, the motivation of this research is to better understand the influences that human decision-making is susceptible to.

1.1 Research Question and Hypotheses

Does the knowledge that one's choice is going to be known or observed have a strong effect on prosocial decision-making and to what extent does the nature of observation and type of trade off being made, matter?

Hypothesis 1: As the prosocial or ideal choice in a game becomes more unambiguous, the observer effect will increase.

Hypothesis 2: As the imminency of observation changes (i.e., in-person, remote, real-time, delayed), the effect on decision-making will also change

Hypothesis 3: As the level of individuation changes (i.e., anonymous vs. non-anonymous), the effect on decision-making will also change.

2 EXPERIMENT DESIGN

In this section, I present the experiment design. First, the logistics of the experiment are described. I then detail the treatment conditions and outline their session structure one by one. Finally, I discuss the possible biases that the experiment is prone to and specific aspects of the design that were used to mitigate these issues.

2.1 Setting

This study is a laboratory experiment and was conducted at the Toronto Experimental Economics Lab (TEEL) at the University of Toronto St. George Campus. The TEEL provides an environment for researchers to study decision-making in a controlled setting. It includes a computer lab with 24 workstations which are connected over a local network. For the appropriate treatments, this setup allowed for live streaming to the admin computer, which I oversaw, and for easy recording.

The design of the lab allowed for the environment to be distraction-free during the sessions. Between each workstation were dividers that ensured subjects could not access information meant for other participants and that they could not see/hear the choices of others. Any communication was thus ensured to be only what was specified in the protocol and between the experimenter (myself) and each of the subjects.

Importantly, all research done at the TEEL is approved by the University of Toronto Research Ethics Board.⁶

2.2 Recruitment

Participants were recruited from the TEEL participant pool, which is hosted on ORSEE, a web-based online recruitment system.⁷ When a new experiment is opened for registration, TEEL sends out e-mail invitations to some or all potential participants based on any inclusion or exclusion criteria. For this experiment, participants could only sign up for one session and thus participate in the experiment only once. The database also ensured that subjects could only opt into a session that both worked for them and had space.

To ensure that there were enough participants for each session, this study invited more subjects than required. As a result of over-recruiting, it was sometimes the case that there were too many subjects present for a given session (i.e., more than 8 subjects). In this case, participants were turned away. Those subjects who were turned away were either volunteers or randomly selected and always received a bump payment equivalent to the “show-up” fee.

Since three of the activities required pairs, each session hosted several pairs of players to ensure that subjects did not know who their partners were. Pairings were randomized for each game.

The study conducted two sessions for each of the 5 conditions. Each session involved 8 subjects, totalling 80 subjects for 10 sessions. Subjects earned \$17.05 on average, including a \$5 show-up fee. Sessions lasted approximately 60 minutes. A session timeline can be found in appendix A.

2.3 Withdrawal and Consent

This study did not use deception. Participants received detailed and accurate information about the research protocol and payment in the introductory letter at the beginning of the session. All versions of the introductory letter can be found in appendix B.

The process used to obtain informed consent for this study followed the guidelines used by the TEEL. The design called for some subjects (those in YO;NA;L and YO;NA;R) to be on camera or recorded during the session. To ensure informed consent was obtained from the subjects, this fact was made clear in the introductory letter and consent form.

Importantly, the consent form for each of the sessions varied to include only information relevant to each treatment. For example, those in the Control sessions where no observation was used and where anonymity was maintained received consent forms that did not mention the use of the webcams. All versions of the consent form can be found in appendix C.

2.4 COVID-19 Considerations

This research adhered to all local public health requirements as of July 2022 (when the experiment began).⁸ In addition, precautions were taken to ensure subject and experimenter safety. For example, all persons involved in the sessions were required to be masked. To circulate air during the sessions, a fan was used. Extra masks and sanitizer were available at all sessions. At the end of each day, the experimenter wiped down workstations with disinfectant.

2.5 Treatment Conditions

All subjects were randomly assigned to one of the five treatments. Each group of 16 participants is then split into two sessions of 8 participants each. See the session schedule in appendix D.

This study extends the simple case of one treatment and one control by having multiple levels of treatment in the same dimension (i.e., different types of observation). Students will participate in only one treatment to avoid the issue of cross-treatment spillover. The treatment groups are named:

- (1) C for Control (which is NO; YA - No Observation, Yes Anonymity)
- (2) NO; NA for No Observation, No Anonymity
- (3) YO; NA; L for Yes Observation, No Anonymity, Livestream
- (4) YO; NA; R for Yes Observation, No Anonymity, Recording
- (5) YO; NA; IP for Yes Observation, No Anonymity, In-Person

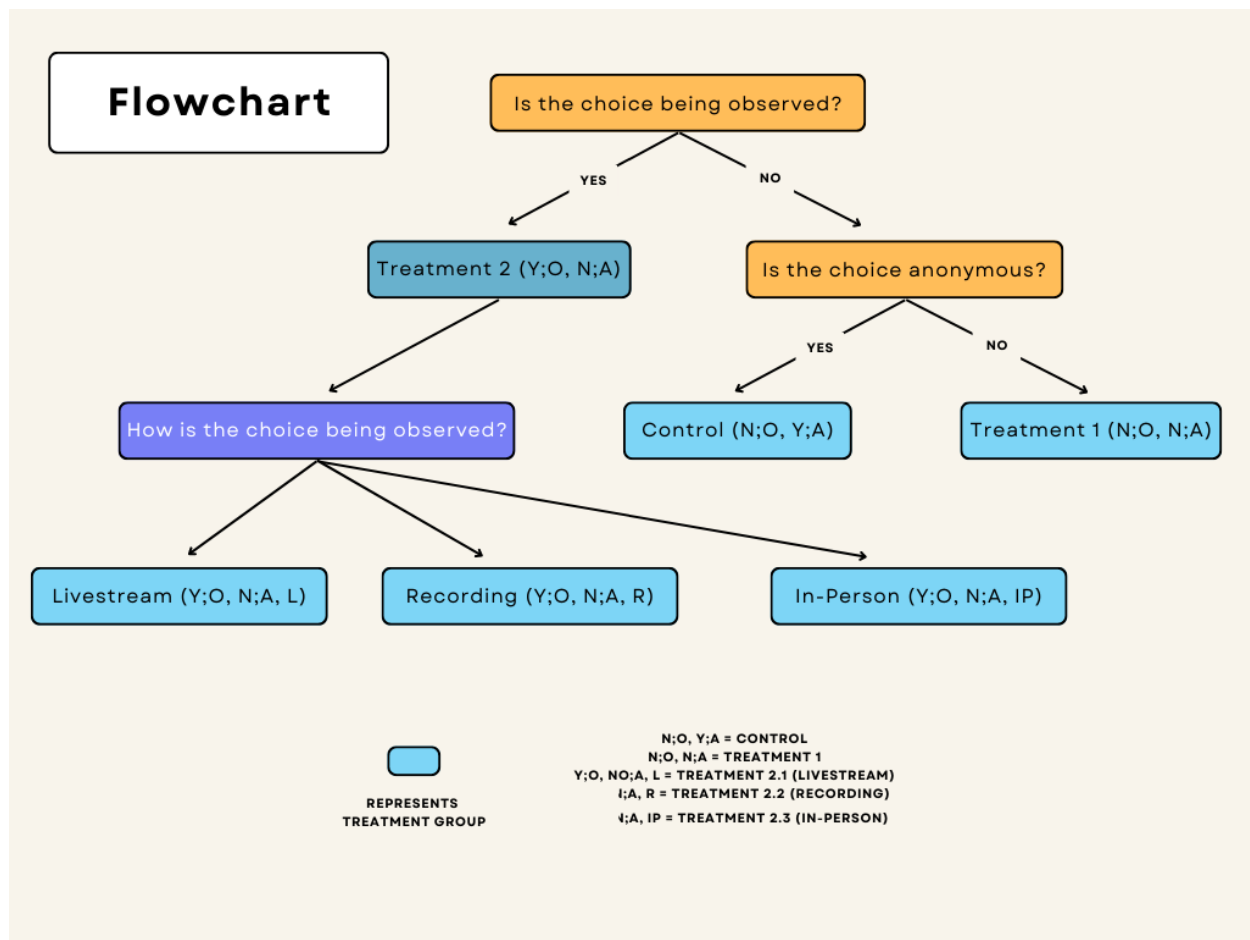


Figure 1: Flowchart of treatment conditions.

In this study, there are two dimensions of observability:

1. **Imminency:** am I watching you make your choice?
2. **Individuation:** can I link you to your choice?

Control (NO; YA): This treatment involves no observation and maintains anonymity. Subjects are not being observed in any way as they make their decisions. The decisions made by subjects cannot be linked back to them.

Treatment 1 (NO; NA): This treatment involves no observation but **does not** maintain anonymity. This means that subjects are not being observed in any way as they make their decisions, but their decisions can be linked back to them. This treatment effectively **adds linkability** and clarifies the effect of individuation. That is, it answers the question, if we see a difference between treatment and baseline, how much is due to a loss of anonymity?

Treatment 2 (YO; NA): This treatment involves observation and does not maintain anonymity. This means that subjects **are** being observed as they make their decisions, **and** their decisions can be linked back to them. This treatment effectively **adds observation**. That is, it answers the question, if we see a difference between treatment 1 and 2, how much is due to adding observation?

Since it is not possible to observe and credibly maintain anonymity, the treatment YO;YA was not used. Notably, there are no relevant or readily available examples of real-life situations in which YO;YA would occur. For these reasons, a full factorial design was not used. Instead, three different forms of observation are tested under treatment 2: livestream, recording, and in-person. It is not necessarily clear which treatment will have the strongest effect.

2.6 Compensation

The TEEL guidelines for compensation are followed. These guidelines suggest having a \$5 show-up fee and earnings between \$15-\$20 an hour. These earnings depend on the participant's decisions during the experiment and, often, the decisions made by other participants during the session. Participants are informed that they will be compensated for their time.

If the participant arrives on time but does not consent to participate in the experiment, they will not be eligible for the show-up payment. After the scheduled start time, anyone who registered for the experiment (that is, was invited and confirmed their participation in a specific session) but did not show up will not receive any compensation.

To avoid order effects, participants will receive earnings from the Holt-Laury Assessment and one of the remaining three games, selected at random. Participants will be informed of this.

If participants choose to withdraw prior to the start of the experiment, they will not receive compensation. If participants choose to withdraw after beginning the experiment, they will receive the \$5 show-up fee but will not receive any earnings from the games.

For all groups, compensation is given in envelopes labelled with identifiers. The method of distributing these envelopes varies between treatment groups. These differences are explained in full under Section 2.8.

2.7 Control - Session Structure

In this section, I detail the procedure used for the Control group. In Section 2.8, I will detail the key differences in the procedure for each of the treatments. While this section summarizes the procedure, the complete script used for each of the sessions can be found in appendix E.

(1) Introduction

1. If all 8 participants show up, skip to 4.
2. If there are too many subjects present for a given session (i.e., 9 instead of 8), some will be turned away. The participant(s) turned away are selected randomly (i.e., I will use a random number generator and whoever is sitting at the workstation that corresponds to the number chosen is asked to leave). Those subjects who are turned away receive a bump payment, which is equivalent to their “show-up” fee.
3. If there are not enough participants (i.e., fewer than 6), the session will be cancelled.
4. Participants will check in by writing their name on a sign-up sheet and initialing next to it. Each subject was asked to present some form of ID to verify that they had indeed signed up for the session on ORSEE. Subjects who did not show up were marked as no-shows. Subjects who were turned away were marked as turned away or moved to another spot in a different session.

5. Participants were then asked to pick one of 8 sheets of paper. Each paper had a unique identifier on it. These identifiers were used to link subjects to their choices and compensation.
6. Participants were then asked to find a seat at one of the workstations.
7. Participants were asked to stow any personal belongings beneath their tables. They were also asked to silence and put away their phones for the duration of the session. This was done to avoid distractions and a loss of control/unexpected variables.
8. I then distributed a copy of the introductory letter to each subject. After doing so, I read the letter aloud and asked subjects to follow along.
9. I then distributed a copy of the consent form to each subject. After doing so, I read the consent form aloud and asked subjects to follow along.
10. I gave participants a few minutes to sign and then collected all the forms.

(2) Games

In each session, participants complete a series of four economic decision-making games. The order of the games is randomized for each of the 10 sessions to ensure that subjects do not pick the most selfless choice in game 1 and then are disproportionately or artificially selfish in the remaining activities. To make understanding compensation simpler, each session either plays the Holt Laury game first or last. A table showing the order of activities in each of the sessions can be found in appendix F.

Two of the games, namely the Holt-Laury Assessment and the Ultimatum Game, have no socially preferred choice (nSPC). Two of the games, namely the dictator game and the Prisoner's dilemma, have a socially preferred choice (SPC). Importantly, these two activities have successfully been used to test altruistic decision-making in previous studies.⁹ Having two games that test the hypothesis and two that do not is done to serve two purposes. Firstly, it is a good test of validity to check that two of the games have no difference in results between treatments. Since two of the activities have nSPC and are expected to be unaffected, we should see no effect. Secondly, this helps to avoid experimenter demand effects. Adding two nSPC games will prevent subjects from inferring what behaviour (prosociality) the experiment is looking for. The procedure for introducing the games is below:

1. I explain that for each game, subjects are paired with another participant in the room. Subjects are made aware that their partner will change randomly for each activity and that they will not know who their partner is.
2. I explain that for each game, subjects receive three things: instructions, a comprehension check, and a choice sheet. I explain that for each activity, I will first distribute the instruction sheet and read it aloud. After doing so, I will distribute a copy of the comprehension check and come around to ensure these are done correctly. Subjects are told to raise their hand to ask me any questions in private so as not to alter the study.
3. I explain that after reviewing the comprehension checks, subjects will be asked to complete the choice sheet.
4. Finally, I distribute a copy of the instructions for the first activity to all subjects. I then read the instructions aloud and ask all participants to follow along. The first activity is completed.

5. I repeat step 4 for each of the other three activities. Individual instructions for each of the four activities can be found in appendix G.

(3) Conclusion

1. I thank the participants for their time and let them know that the activities are now complete.
2. I ask a volunteer to pick a numbered chip out of a bag to determine which of the Prisoner's dilemma, Ultimatum Game, and dictator game everyone will be compensated for in addition to the Holt-Laury Assessment.
3. I then hand out a copy of the questionnaire to all subjects. The questionnaire is anonymous, includes the Prosocial Scale created by Caprara and Pastorelli and asks questions related to demographics, psychographics, and perception of the experiment.¹⁰ The post-experiment questionnaire can be found in appendix H. As those are being completed, I calculate compensation and prepare the envelopes.
4. I then collect completed questionnaires and hand out a copy of the debrief form for subjects to read. The debrief form can be found in appendix I.
5. I then distribute compensation. For the Control group, I place all envelopes on a table and ask participants to collect their envelope at the same time.
6. Participants are free to go.

2.8 All Other Treatments – Session Structure

In this section, I highlight the key differences in the session structure described in Section 2.8 for each of the treatment groups. The main differences are in the (1) session set-up and (2) compensation distribution.

Control (NO;YA)

- (1) Set-up: To accomplish anonymity, the claim cheque system is used. At the beginning of the session, participants randomly choose an identifier. All choice sheets collected are labelled with the participant's identifier. All decisions are recorded on the sheets without observation.
- (2) Compensation: To maintain anonymity, compensation is given to participants in envelopes labelled with their identifier. All envelopes are placed on a table and participants are called up at once to retrieve their envelope.

NO;NA

- (1) Set-up: At the beginning of the session, participants randomly choose an identifier. All choice sheets collected are labelled with the participant's identifier. All decisions are recorded on the sheets without observation.
- (2) Compensation: Participants are called up to the front one by one by their identifier to collect an envelope labelled with their identifier. This effectively removes anonymity; each subject becomes aware that I know what choices they have made and how much they have earned.

YO;NA;IP

- (1) Set-up: At the beginning of the session, participants randomly choose an identifier. All choice sheets are labelled with the participant's identifier and all decisions are recorded on the sheets. I

then go to each workstation and ask each subject to tell me their choice and identifier out loud. I maintain the fiction of entering their choices into my laptop as I go from station to station.

(2) Compensation: Participants are called up to the front one by one by their identifier to collect an envelope labelled with their identifier. This effectively removes anonymity; each subject becomes aware that I know what choices they have made and how much they have earned.

YO;NA;L

(1) Set-up: At the beginning of the session, participants randomly choose an identifier. The webcam and livestream at each of the workstations is started after consent is retrieved from all subjects. All choice sheets are labelled with the participant's identifier and all decisions are recorded on the sheets under the observation of the webcam. I ask each participant to keep their choice sheet within view of the camera.

(2) Compensation: Participants are called up to the front one by one by their identifier to collect an envelope labelled with their identifier. This effectively removes anonymity; each subject becomes aware that I know what choices they have made and how much they have earned.

YO;NA;R

(1) Set-up: At the beginning of the session, participants randomly choose an identifier. The webcam recording at each of the workstations is started after consent is retrieved from all subjects. All choice sheets are labelled with the participant's identifier and all decisions are recorded on the sheets under the observation of the webcam. I ask each participant to keep their choice sheet within view of the camera.

(2) Compensation: Participants are called up to the front one by one by their identifier to collect an envelope labelled with their identifier. This effectively removes anonymity; each subject becomes aware that I know what choices they have made and how much they have earned.

2.9 Discussion

To rule out alternative explanations for any effects found in this study, several aspects of the experiment design were adjusted to account for potential biases.

First, to avoid cross-treatment spillover, that is, to rule out that exposure to or decisions made in one treatment affect how subjects behave in another, a between-subject design was used.¹¹ This encompasses order effects, salience effects, and experimenter demand effects. The order that activities were played was randomized each session to avoid any sequential bias (e.g., results in game 2 are affected by game 1 since it is always played after etc.). This also allowed the study to account for decision fatigue, that is, accounting for the fact that decisions made in later activities may be made with less consideration or thought than earlier decisions. Randomizing the order helps to reduce any effect of decision fatigue on the results of the study.

Salience effects, which stem from subjects noting the difference between two treatments and then conditioning their behaviour in the later treatment, were avoided by only allowing participants to partake in the study once.¹² Finally, experimenter demand effects, that is, when a subject believes he or she knows what behaviour the experimenter is looking for and desires to give the experimenter this behaviour (or not conform to the behaviour consistent with the experimenter's hypothesis), is more prone in a within-subject design. Importantly, a between-subject design is one where outcomes are compared across subjects who participated in different

treatments.¹³ Although it is still possible to get spillovers with between-subject design if participants in earlier sessions speak to participants in future sessions about what happened in the experiment, it is a lesser risk than using a within-subject design.

Second, another way that the experiment avoided order effects, that is, ensuring that a subject’s choice in the first activity does not affect their choices in the second, third, and fourth activities, was through compensation structure. Participants were told that they would receive payment for the first or last game for certain, which for all sessions was the Holt-Laury Assessment, plus winnings from one of the remaining three activities chosen at random. This way, the subject must treat each activity individually (i.e., they are less likely to be most selfless in the first game and more selfish in the remainder after having proven or established “prosociality”).

Third, the study aimed to avoid effects caused by subject confusion and learning by task succession. In the activities, subjects may have been asked to make choices that they had never before faced, so it may not be obvious to them which option they prefer. This means that they may improve their understanding, and thus change their decisions, as they complete more activities. To avoid early decisions being affected by confusion, subjects completed comprehension checks to ensure understanding. Randomizing the activity order also helps with this.

3. RESULTS

In this section, I present the data collected from each of the four economic decision-making activities under each treatment condition, the data collected from the post-experiment questionnaire, and insights based on this information.

To begin, I will first establish successful randomization across all treatments. Figure 2 below shows the means and standard deviations for several standard demographic variables such as gender, ethnicity etc. Given that these data are different for each treatment, the hypothesis that all the treatments are the same can be rejected.

The use of randomization in the experiment design means that linear regression is not necessary as it controls for other independent variables that may impact the outcome of a single dependent variable. Since treatment assignment is random, the mean outcomes of variable(s) can be compared across treatment groups and between treatment and control.

	Control	NO;NA	YO;NA;IP	YO;NA;L	YO;NA;R	p-value
Age	2.250 (0.829)	2.313 (0.682)	2.375 (0.927)	2.625 (0.781)	2.188 (0.882)	0.714
Ethnicity	3.375 (2.619)	2.875 (2.342)	3.875 (2.913)	2.125 (2.233)	2.250 (1.785)	0.391
Gender	0.563 (0.609)	0.688 (0.583)	0.563 (0.496)	0.938 (0.658)	0.750 (0.661)	0.610
Enrollment Status	2.063 (0.428)	2.063 (0.242)	1.938 (0.242)	2.125 (0.331)	2.125 (0.331)	0.908
Political Views	0.364 (0.643)	0.846 (0.361)	0.308 (0.722)	0.545 (0.498)	0.167 (0.799)	0.812
Observations	16	16	16	16	16	

Figure 2: Summary Statistics for Subject Demographic Characteristics

Age = ordinal with 1 = 18-19, 2 = 20-21, 3 = 22-23, 4 = 24 or older. **Ethnicity** = ordinal with 1 = Asian-Eastern, 2 = Asian – India, 3 = Black, 4 = First Nations, 5 = Hispanic (any race), 6 = Caucasian, 7 = Other (4 mixed race, 1 middle eastern), 8 = Prefer not to respond. **Gender** = ordinal with 0 = male, 1 = female, 2 = non-binary. **Enrollment Status** = ordinal with 1 = part-time, 2 = full-time, 3 = other (5 recent graduates, 1 employee). **Political Views** = ordinal with -1 = conservative, 0 = moderate, 1 = liberal. All comparisons use Kruskal Wallis.

Reported in Figure 2 are also p-values for tests of differences across the Control and treatment groups. There are no significant differences found ($p = 0.05$). In summary, 30 (38%) subjects were male, 45 (56%) subjects were female, and 5 (6%) subjects were non-binary.

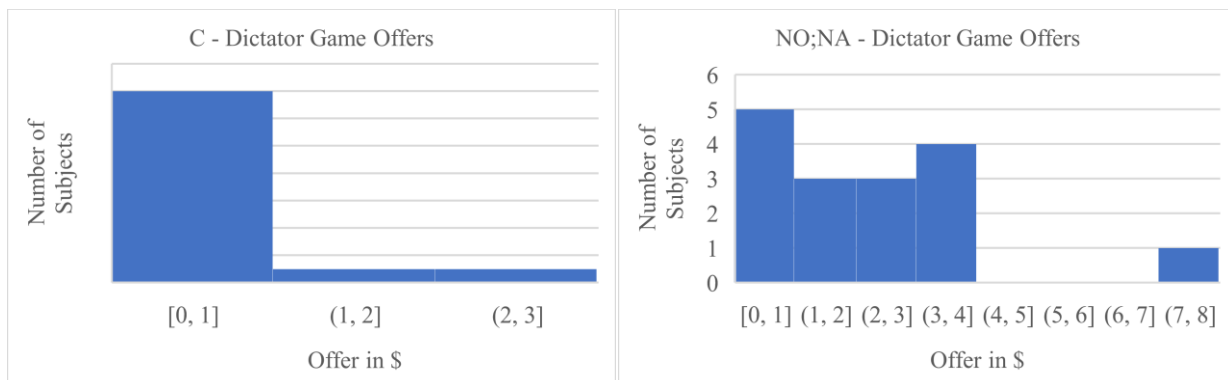
Of all participants, 10 (13%) were between the ages of 18-19, 41 (51%) were aged 20-21, 20 (25%) were aged 22-23 and 9 (11%) were aged 24 or older. Of all participants, 44 (55%) were Asian – Eastern, 8 (10%) were Asian – Indian, 2 (3%) were Black, 4 (5%) were Hispanic, 10 (13%) were Caucasian, 10 (13%) were Other (bi-racial, Sri Lankan), and 2 (3%) preferred not to respond. The majority of participants (71%) were full-time students at the University of Toronto and reported having liberal political views (41%).

The results are analyzed as follows. First is the Control. In Section 3.1, we show that the Control group was consistent with previous findings that show that a lack of individuation decreases prosocial behaviour. Specifically, all participants in the Control opted to defect in the prisoner’s dilemma, that is, to not co-operate. In Section 3.2, I show the treatment effect of introducing individuation, that is, the removal of anonymity (NO;NA). In Section 3.3, I show the impact of adding observation in the remaining three treatments (YO;NA;IP, L, R). It is found that the addition of observation does increase prosocial behaviour (i.e., offers) when compared to the baseline.

The results focus on the change in offered endowments. I find no statistically significant effect across treatments in the prisoner’s dilemma (which measures trust, and to some extent, prosociality), the ultimatum game (which measures inequity aversion), and the Holt-Laury Assessment (which measures risk preferences). I find a strong effect across treatments for the dictator game, which measures prosociality.

3.1 Prosocial Decision-Making Under NO;YA

Figure 3 shows the means and standard deviations of choices made in each of the economic decision-making activities across all treatments. The table also includes the p-value.



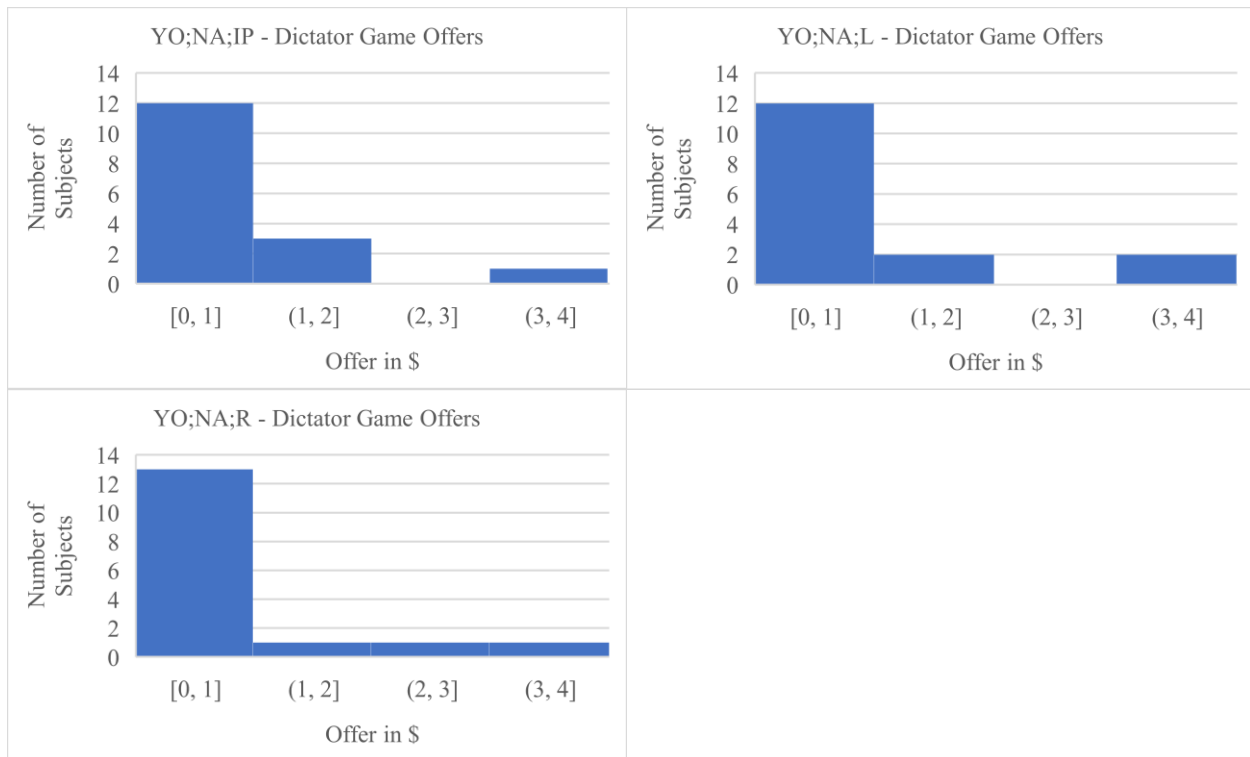


Figure 4: Histograms showing the offers made by subjects in the dictator game across all treatments

Prisoner's dilemma Results					
	Control	NO;NA	YO;NA;IP	YO;NA;L	YO;NA;R
Defect	16 (100%)	12 (75%)	13 (81%)	14 (88%)	15 (94%)
Co-operate	0 (0%)	4 (25%)	3 (19%)	2 (12%)	1 (6%)

Figure 5: Table showing the defect vs. co-operate split across all treatments (also shown in Figure 3)

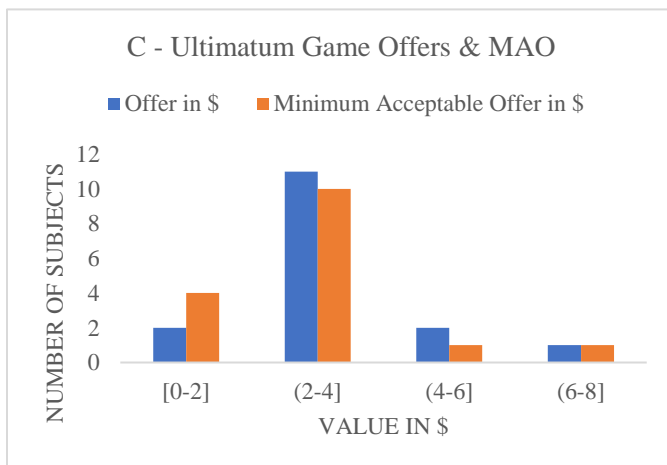
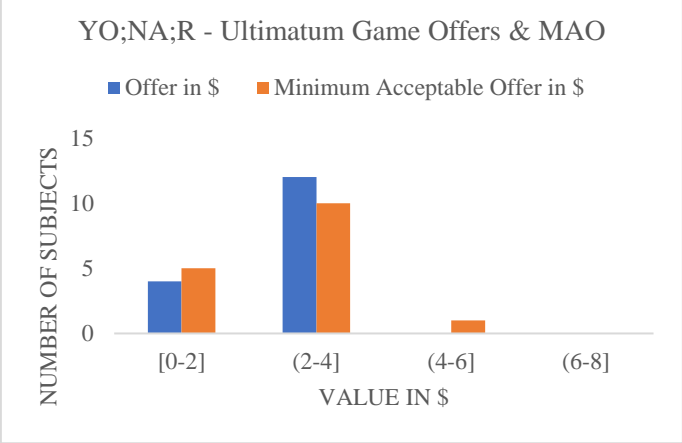
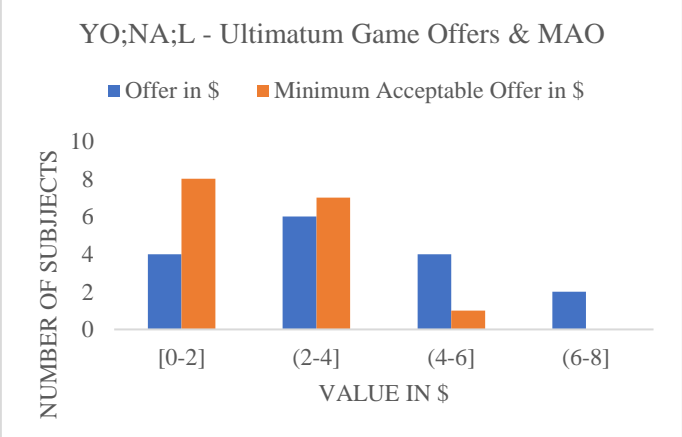
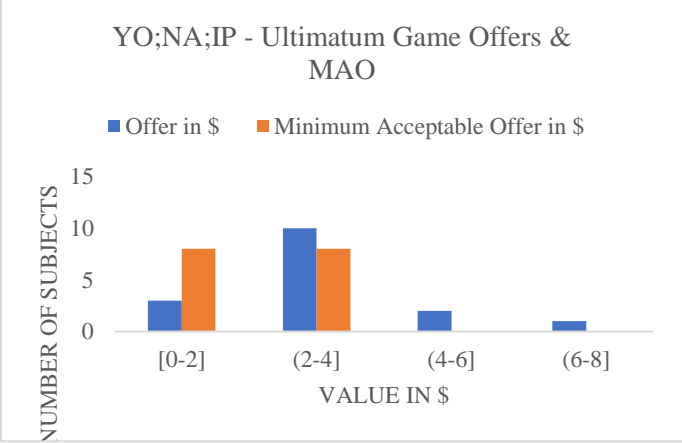
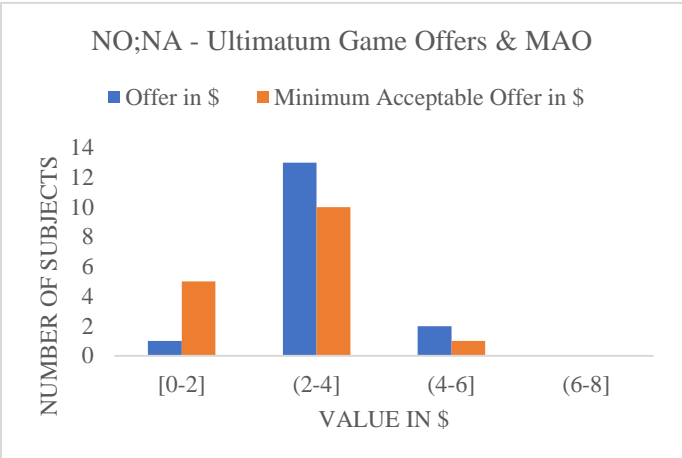
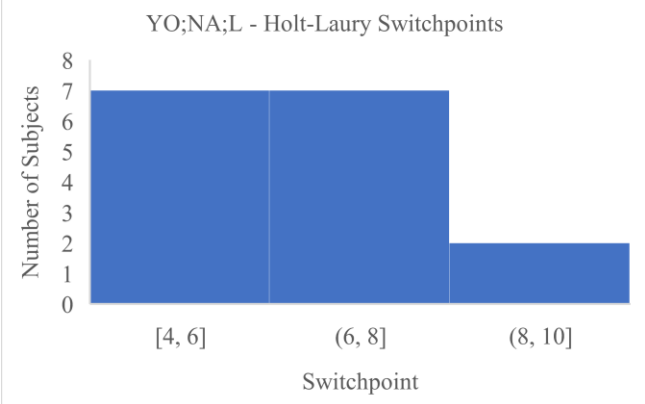
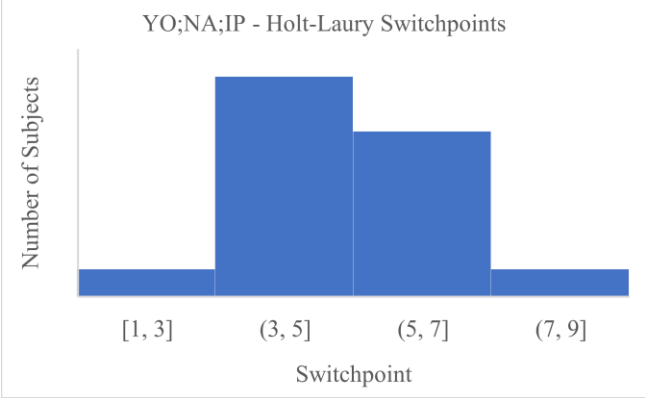
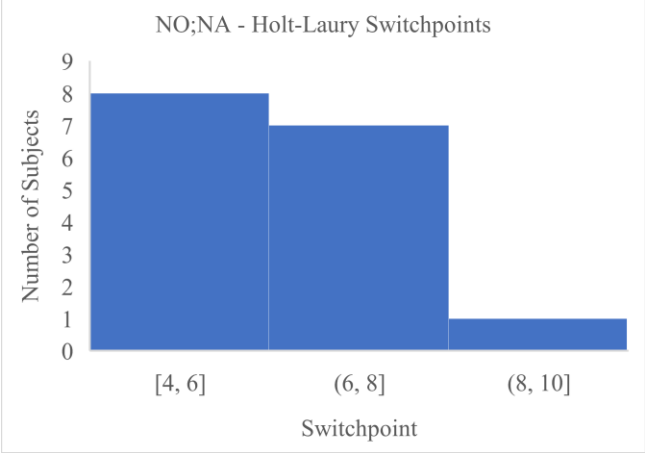
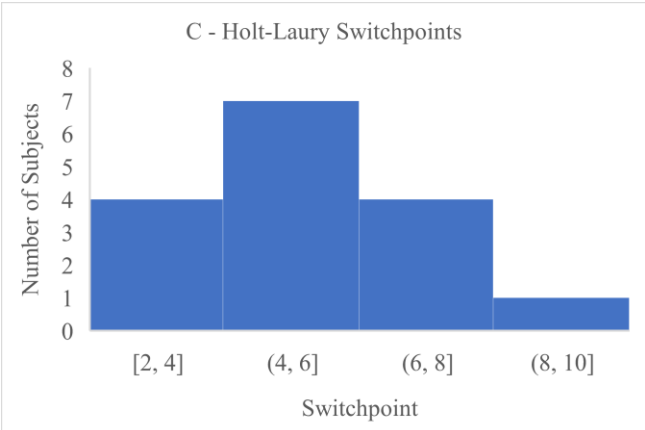


Figure 6: Histograms showing the offers made by subjects in the ultimatum game, and their minimum acceptable offers across all treatments.





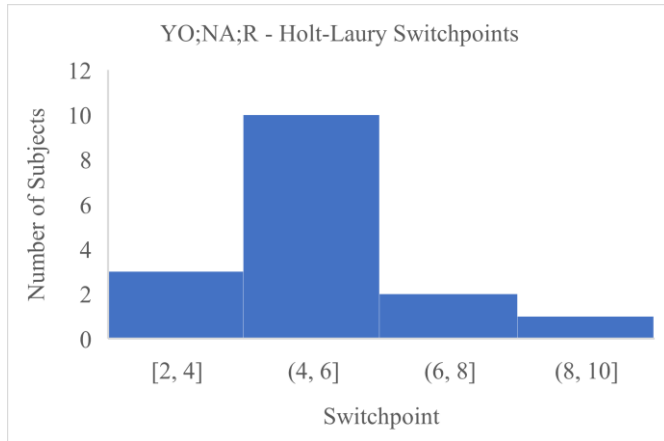


Figure 7: Histograms showing the switch points in the Holt-Laury Assessment across all treatments.

	Control	NO;NA	YO;NA;IP	YO;NA;L	YO;NA;R	
	(0)	(1)	(2)	(3)	(4)	p-value
DG₁	0.375 (0.857)	2.563 (1.999)	0.625 (1.166)	0.750 (1.392)	0.563 (1.223)	0.005238
DG₂	5%	32%	8%	9%	7%	-
UG₁	3.813 (1.845)	3.875 (0.857)	3.750 (1.714)	3.938 (1.952)	3.188 (1.333)	0.591184
UG₂	3.313 (1.895)	2.875 (1.495)	2.375 (1.364)	2.250 (1.601)	2.563 (1.580)	0.520205
PD₁	0 (0)	0.25 (0.433)	0.188 (0.390)	0.125 (0.331)	0.063 (0.242)	0.762983
PD₂	0%	25%	19%	13%	6%	-
PD₃	100%	75%	81%	88%	94%	-
HL₁	5.625 (1.691)	6.375 (1.409)	5.125 (1.691)	6.688 (1.685)	5.500 (1.658)	0.09338
HL₂	5.286 (1.485)	6.267 (1.389)	5.125 (1.691)	6.083 (1.498)	5.267 (1.436)	0.258997

Figure 3: Summary Statistics for Decision-Making Data Across Treatments

DG₁ = dictator game: mean offer (SD), **DG₂** = dictator game: average % given (% prosocial), **UG₁** = ultimatum game: mean offer (SD), **UG₂** = ultimatum game: mean minimum acceptable offer (SD), **PD₁** = prisoner's dilemma: mean (SD), binary indicator is 1 if co-operate, else 0, **PD₂** = % of treatment participants who co-operated, **PD₃** = % of treatment participants who defected, **HL₁** = Holt-Laury Assessment: mean of last switch point (SD), **HL₂** = Holt-Laury Assessment: mean of last switch point disregarding any subjects with more than one switch (SD)

Figure 3 shows the means and standard deviations of choices made in each of the economic decision-making activities across all treatments. The table also includes the p-value.

In the Control, we see that the majority of offers made are either \$0 or \$1. Looking at the raw data, only 1 of the subjects in the first bin offered \$1 and the rest (13 subjects) offered nothing. This low rate of prosociality under the Control, which is no observation and maintains anonymity, is consistent with previously published findings. We see that the rate of prosociality (% given) is

5% and is the lowest of all groups (Figure 3). Specifically, Hoffman, McCabe and Smith were pioneers in showing that the decisions people make in labs are influenced by the extent to which they have anonymity.¹⁴ Their study showed that as they increase the anonymity of subjects, that is, as they increase social isolation, offers become lower in the dictator game. Interestingly, this study brings this fundamental finding into the 21st century with the introduction of camera surveillance; namely, the treatments YO;NA;L (livestream) and YO;NA;R (recording).

The results of the prisoner's dilemma are also consistent with this description. In the Control, it is shown that 0 (0%) participants chose to co-operate. In the ultimatum game, it is shown that the majority of subjects offered between \$2 and \$4, and the most common minimum acceptable offer also was between \$2 and \$4. Figure 3 gives the mean offer, \$3.8, and the mean minimum acceptable offer \$3.3. This is the highest minimum acceptable offer across all treatments. This may indicate that a lack of observation and the maintenance of anonymity is correlated with stronger attitudes towards inequity aversion, although no significant differences were found across treatments (p -value <0.05).

Lastly, the Holt-Laury Assessment histogram for the Control shows quite a diverse spread across bins. As shown in Figure 3, there is no significant difference found across treatments for the switch point.

3.2 The Effect of Individuation (NO;NA) on Prosocial Decision-Making

This section points out the treatment effect of introducing individuation (going from Control = NO;YA to NO;NA). Referring to the Hoffman, McCabe and Smith findings described in Section 3.1, it is found that there are in fact significant differences across offers made in the dictator game. Introducing individuation has the greatest impact when comparing the difference between C and NO;NA and C and any of the other treatments where observation is added. This indicates that the removal of anonymity has a great impact on prosocial behaviour, and as shown by the p -value in Figure 3, in preferences for co-operation, inequity aversion, and risk.

In the dictator game, Figure 4 shows a stark difference in the spread of data. The upper limit in the Control is 3 while it is 8 in NO;NA. Notably, 8 means that the subject offered 100% of their earnings to their partner. This treatment is the only one in which an offer of 100% is made. There are no offers made between \$5 and \$7. Comparing once again to the baseline, it is obvious that removing anonymity significantly increased the value of the offers. Figure 3 shows that the average percent given in the Control is 5% compared to 32% in NO;NA. This is the largest difference between any two treatment conditions in the entire study.

The results of the prisoner's dilemma show a significant increase in the number of subjects who chose to co-operate when compared to baseline. 25% of subjects in NO;NA chose to co-operate. Again, this is the largest difference between any two treatment conditions for results in the prisoner's dilemma (0% to 25% co-operation).

The ultimatum game shows a relatively similar spread between C and NO;NA. Again, no significant differences are found across the means and standard deviations of offers and minimum acceptable offers. Interestingly, the mean offer and mean minimum acceptable offer in C and NO;NA are the closest numerically of all treatment conditions. This may indicate a correlation between inequity aversion and a lack of observation.

Lastly, the results of the Holt-Laury Assessment show a slightly different spread than those in the Control. In NO;NA, none of the switches were made at a decision number before 4. In the Control, the earliest switch was made at decision 2. Again, no significant differences are found across treatments for the mean and standard deviation of switch points.

3.3 The Effect of Observation (YO;NA;IP, L, R) on Prosocial Decision-Making

This section describes the impact of adding observation in the remaining three treatments, YO;NA;IP, YO;NA;L, and YO;NA;R. It is found that the addition of observation does increase prosocial behaviour when compared to the baseline.

In the dictator game, it is shown that the spread of offers increases when observation is added. In the Control, the upper limit of the last bin is \$3 while in YO;NA;IP, YO;NA;L, and YO;NA;R, the upper limit of the last bin is \$4. Given that the upper limit is consistent across all treatments with observation, this may indicate that the addition of observation does impact the amount that subjects choose to offer, thus, impacting their prosociality. The significance of this finding is also noted in Figure 3 as it is shown that the p-value is statistically significant. Figure 3 also points out that the average percentage given in each of the observation conditions is higher than that in the Control, with C = 5%, YO;NA;IP = 8%, YO;NA;L = 9%, and YO;NA;R = 7%. The differences between each of the observation treatments may be indicative of how each type of observation may have a stronger impact than the others, with the livestream condition having the greatest impact and the recorded condition having the lowest impact when compared to baseline.

The results of the prisoner's dilemma show that each of the observation treatments had a higher rate of co-operation than the baseline although Figure 3 indicates no significant difference across treatments. The rate of co-operation in the Control was 0% and 19%, 12% and 6% in YO;NA;IP, YO;NA;L, and YO;NA;R, respectively. The greatest difference in the rate of co-operation is between baseline and YO;NA;IP (0% vs. 19%). It may be worth pointing out that the treatment condition YO;NA;IP had subjects voice their decisions aloud. While the purpose was to increase individuation between the subject and the experimenter, it is also entirely possible that saying choices aloud in the same room, and perhaps within earshot of some other subjects, influenced the likelihood that a subject would choose to co-operate vs. defect.

The ultimatum game shows that fewer subjects in observation treatments, on average, tend to offer or accept values between \$2 and \$4 when compared to baseline. Figure 3 shows that the mean offer in YO;NA;L is the highest and the lowest in YO;NA;R across all treatments; however, no significant differences are found across treatments. The minimum acceptable offer is the lowest across all observation treatments when compared to the baseline and NO;NA.

Lastly, the Holt-Laury game shows no significant differences in the spread, mean or standard deviations of the last switch point across treatments.

3.4 Questionnaire Responses

		Demographic Data Table					KW H-value	p-value
		Control	NO;NA	YO;NA;I P	YO;NA; L	YO;NA; R		
		(0)	(1)	(2)	(3)	(4)		
Part 1	Q1	4.938 (1.478)	5.438 (1.273)	5.563 (1.059)	5.375 (1.763)	5.063 (1.435)	2.249	0.690
	Q2	5.563 (1.903)	6.313 (1.044)	5.625 (1.728)	6.125 (1.111)	6.375 (0.599)	1.458	0.834
	Q3	5.563 (1.368)	5.438 (1.321)	5.500 (1.541)	5.500 (1.414)	5.438 (1.580)	0.131	0.998
Part 2	Q1	4.250 (0.750)	4.250 (0.750)	4.188 (1.184)	4.250 (0.433)	4.375 (0.599)	0.784	0.941
	Q2	3.813 (0.634)	4.000 (0.612)	4.000 (0.935)	4.188 (0.882)	4.313 (0.464)	3.714	0.446

Part 3	Q3	4.125 (0.696)	4.125 (0.857)	4.125 (0.781)	4.125 (0.696)	4.188 (0.634)	0.079	0.999
	Q4	3.500 (1.118)	3.563 (1.116)	3.500 (1.323)	3.813 (0.950)	3.688 (0.982)	0.613	0.962
	Q5	3.750 (0.829)	4.000 (1.061)	4.000 (1.061)	4.000 (0.707)	3.813 (0.882)	1.903	0.754
	Q6	3.250 (1.090)	3.125 (1.218)	3.438 (0.998)	3.500 (0.866)	3.188 (0.634)	1.661	0.798
	Q7	3.313 (1.102)	3.438 (0.998)	4.063 (0.747)	3.750 (1.146)	3.500 (0.935)	4.598	0.331
	Q8	2.438 (1.223)	3.063 (1.144)	2.813 (1.236)	3.375 (0.857)	3.000 (0.935)	5.77	0.217
	Q9	4.063 (0.827)	4.125 (0.599)	3.938 (0.966)	3.813 (1.014)	3.875 (0.927)	0.626	0.96
	Q10	3.750 (0.750)	3.875 (0.857)	3.813 (1.014)	3.875 (0.857)	4.000 (1.000)	1.087	0.896
	Q11	2.625 (1.053)	2.813 (1.014)	3.125 (1.317)	3.063 (1.248)	2.563 (1.116)	2.023	0.732
	Q12	3.125 (0.992)	3.313 (1.158)	3.188 (1.333)	3.813 (0.950)	3.625 (0.696)	4.452	0.348
	Q13	3.188 (1.014)	3.563 (1.223)	3.500 (1.118)	3.500 (0.935)	3.500 (0.935)	1.205	0.877
	Q14	3.750 (0.750)	4.000 (0.612)	3.563 (1.223)	3.938 (0.747)	3.750 (0.968)	1.229	0.873
	Q15	3.500 (0.866)	4.000 (0.707)	3.563 (0.864)	3.313 (0.916)	3.938 (1.088)	6.236	0.182
	Q16	3.313 (0.916)	3.688 (0.982)	3.125 (1.111)	4.000 (0.791)	4.000 (0.866)	8.601	0.072
	interested	3.813 (0.950)	3.750 (0.968)	3.500 (1.118)	3.250 (1.090)	3.733 (1.123)	2.693	0.61
	distressed	2.063 (1.391)	1.813 (0.882)	1.750 (0.901)	2.188 (1.014)	2.063 (1.197)	1.457	0.834
	excited	3.250 (0.968)	2.563 (1.456)	2.688 (1.310)	2.875 (1.111)	2.438 (0.864)	4.632	0.327
	upset	1.625 (1.053)	1.438 (0.609)	1.563 (1.059)	2.000 (1.061)	1.563 (0.933)	2.97	0.563
	strong	2.500 (0.935)	2.500 (1.369)	2.500 (1.173)	2.688 (1.044)	2.688 (1.102)	0.432	0.98
	active	3.000 (1.173)	2.250 (1.090)	2.438 (1.413)	2.750 (1.392)	2.813 (1.184)	3.462	0.484
hostile	1.188 (0.390)	1.250 (0.559)	1.813 (1.130)	2.188 (1.379)	1.563 (0.788)	5.283	0.259	
proud	2.563 (0.933)	2.188 (1.014)	2.625 (0.992)	2.938 (0.966)	2.500 (1.173)	3.314	0.507	
afraid	1.688 (1.102)	1.750 (1.199)	1.750 (1.031)	1.875 (0.857)	1.375 (0.992)	4.216	0.378	
irritable	1.625 (0.992)	1.875 (0.857)	1.563 (0.864)	1.938 (0.966)	1.813 (0.882)	2.129	0.712	
alert	2.813 (1.236)	2.625 (1.269)	2.875 (1.317)	2.563 (0.998)	2.750 (1.090)	0.468	0.977	

	ashamed	1.625 (1.317)	1.313 (0.768)	1.600 (1.143)	1.813 (0.950)	1.313 (0.583)	3.515	0.476
	nervous	2.063 (1.144)	2.563 (1.499)	1.938 (0.899)	2.250 (1.199)	1.938 (1.088)	1.684	0.794
	determined	2.688 (0.982)	2.875 (1.364)	2.875 (1.111)	3.125 (1.166)	3.000 (1.275)	1.02	0.907
	scared	1.625 (1.218)	1.625 (1.166)	1.313 (0.583)	1.625 (1.053)	1.688 (1.158)	0.498	0.974
	enthusiastic	2.813 (1.014)	3.000 (1.369)	2.813 (1.333)	3.313 (0.916)	3.063 (1.197)	1.882	0.757
	guilty	1.250 (0.750)	1.625 (0.857)	1.813 (1.236)	1.750 (0.901)	1.500 (0.791)	3.478	0.481
	inspired	2.063 (0.966)	2.938 (1.298)	3.000 (1.414)	2.813 (1.184)	2.813 (1.424)	5.078	0.279
	attentive	3.125 (1.111)	2.750 (1.146)	3.188 (1.130)	2.813 (0.950)	3.063 (1.029)	1.537	0.82
	jittery	2.125 (1.053)	1.813 (0.882)	1.750 (0.968)	2.250 (1.090)	2.250 (0.968)	3.29	0.511
	Part 4	Q1	0.500 (0.500)	0.625 (0.484)	0.563 (0.496)	0.438 (0.496)	0.500 (0.500)	0.963
Q2		30.938 (39.930)	20.000 (25.678)	35.000 (39.922)	20.625 (29.041)	12.500 (18.540)	1.994	0.737
Q3		-0.063 (0.428)	-0.125 (0.484)	0.125 (0.696)	-0.188 (0.390)	0.188 (0.527)	3.608	0.462
Part 5	Q1	2.250 (0.829)	2.313 (0.682)	2.375 (0.927)	2.625 (0.781)	2.188 (0.882)	2.118	0.714
	Q2	3.375 (2.619)	2.875 (2.342)	3.875 (2.913)	2.125 (2.233)	2.250 (1.785)	4.116	0.391
	Q3	0.563 (0.609)	0.688 (0.583)	0.563 (0.496)	0.938 (0.658)	0.750 (0.661)	2.696	0.61
	Q4	2.063 (0.428)	2.063 (0.242)	1.938 (0.242)	2.125 (0.331)	2.125 (0.331)	1.012	0.908
	Q5	31.188 (45.722)	19.250 (38.312)	25 (42.729)	31.313 (45.637)	24.875 (42.802)	1.581	0.812
	Q5 (without 99)	0.364 (0.643)	0.846 (0.361)	0.308 (0.722)	0.545 (0.498)	0.167 (0.799)	-	-
Part 5 Q1	18-19	19%	6%	19%	0%	19%	-	-
	20-21	44%	63%	38%	56%	56%	-	-
	22-23	31%	25%	31%	25%	13%	-	-
	24 or older	6%	6%	13%	19%	13%	-	-
Part 5 Q2	Asian – Eastern	44%	50%	50%	75%	56%	-	-
	Asian – Indian	13%	13%	0%	6%	19%	-	-
	Black	6%	6%	0%	0%	0%	-	-
	First Nations	0%	0%	0%	0%	0%	-	-
	Hispanic (any race)	0%	6%	0%	0%	19%	-	-

	White / Caucasian	13%	13%	19%	13%	6%	-	-
	Other	25%	13%	25%	0%	0%	-	-
	PNR	0%	0%	6%	6%	0%	-	-
Part 5 Q3	Male	50%	38%	44%	19%	38%	-	-
	Female	44%	56%	56%	75%	50%	-	-
	Non-Binary	6%	6%	0%	0%	13%	-	-
Part 5 Q4	Other/PNR	0%	0%	0%	6%	0%	-	-
	Part-time	6%	0%	6%	0%	0%	-	-
	Full-time	81%	94%	94%	88%	88%	-	-
Part 5 Q5	Other	13%	6%	0%	13%	13%	-	-
	Conservative	6%	0%	13%	0%	19%	-	-
	Moderate	31%	13%	31%	31%	25%	-	-
	Liberal	31%	69%	38%	38%	31%	-	-
	PNR	31%	19%	25%	31%	25%	-	-

Figure 8: Summary of Demographic Characteristics of all Subjects

Part 1: ordinal, with Strongly Disagree = 1 and Strongly Agree = 7

Q1 = Generally speaking, I only trust people that I have known for a while.

Q2 = Generally speaking, there are only a few people that I can trust completely.

Q3 = Generally speaking, I consider myself to be trustworthy.

Part 2: ordinal, with Almost Never = 1 and Almost Always = 5

Q1 = I am pleased to help my friends/colleagues in their activities.

Q2 = share the things that I have with my friends.

Q3 = I try to help others.

Q4 = I am available for volunteer activities to help those who are in need.

Q5 = I am empathic with those who are in need.

Q6 = I help immediately those who are in need.

Q7 = I do what I can to help others avoid getting into trouble.

Q8 = I intensely feel what others feel.

Q9 = I am willing to make my knowledge and abilities available to others.

Q10 = I try to console those who are sad.

Q11 = I easily lend money or other things.

Q12 = I easily put myself in the shoes of those who are in discomfort.

Q13 = I try to be close to and take care of those who are in need.

Q14 = I easily share with friends any good opportunity that comes to me.

Q15 = I spend time with those friends who feel lonely.

Q16 = I immediately sense my friends' discomfort even when it is not directly communicated to me.

Part 3 (rating each item; already listed in table): ordinal, with Not At All = 1 and Almost Always = 5

Part 4: measures vary; listed with each question

Q1 = Suppose you could give some of your earnings (if applicable) from this experiment to charity.

Would you? Measure: N = 0, Y = 1

Q2 = What percentage of your earnings would you give? Measure: by percent, 0%, 25%, 50%, 75%, 100%

Q3 = How would you say you did in comparison to your opponents? Measure: Better = 1, Same = 0, Worse = -1

Part 5: measures vary; listed with each question

Q1 = What is your age? Measure: 18-19 = 1, 20-21 = 2, 22-23 = 3, 24 or older = 4

Q2 = Please specify your ethnicity Measure: Asian - Eastern = 1, Asian - Indian = 2, Black = 3, First Nations = 4, Hispanic (any race) = 5, White / Caucasian = 6, Other (please specify) = 7, Prefer not to respond = 8

Q3 = How do you identify? Measure: M = 0, F = 1, Non-binary = 2, Other/Prefer not to respond = 3

Q4 = What is your enrollment status? Measure: Part-time = 1, Full-time = 2, Other = 3

Q5 = Which best describes your political views? Measure: Conservative = -1, Moderate = 0, Liberal = 1, Prefer not to respond = 99

4. CONCLUSION AND DISCUSSION

4.1 Risks

Subjects made choices where the monetary outcome of their decision is not known for certain ahead of time. This means that subjects may feel regret or embarrassment if they ultimately feel that they made the wrong choice. This risk is minimized by a) the low stakes; and b) that the subjects are truthfully informed that only the experimenter will know what their choices are. This also minimizes any anxiety that subjects have about others knowing what their decisions are.

4.2 Assumptions

A frequent concern with lab experiments is their low level of mundane realism, which is a form of external validity. This is the likelihood that the research mimics or resembles a real-world setting. Most subjects will not encounter economic decision-making scenarios in as abstract a fashion as this study. It is assumed that this study provided enough experimental realism. That is, it is assumed that the setting and procedures felt involving and real enough for the participant to mimic what their decisions would be like in a non-laboratory context. Experimental realism was accomplished by providing financial incentives and by pairing participants with someone else in the same session who is affected by their decisions in real-time.

4.3 Conclusion

This experiment was designed to determine the impact of specific dimensions of observation on prosocial behaviour and to test the given hypotheses.

It is found that as the prosocial choice in a game becomes more unambiguous it is not necessary that the observer effect increases. The prosocial choice in the prisoner's dilemma is arguably less ambiguous than the prosocial choice in the dictator game because there is no set "ideal" amount to offer. Some may consider a fair amount to be 50% of their endowment or more – but not necessarily everyone. In the prisoner's dilemma, it is clear that co-operating is the prosocial choice in comparison to defecting because it is binary. The lack of significant differences across treatments for the result of the prisoner's dilemma in comparison to the dictator game indicates that this hypothesis is false.

The changes in imminency of observation (i.e., whether it was in-person, livestreamed, in real-time or delayed via recording) did impact prosocial decision-making. This proves the second hypothesis.

Finally, the third hypothesis is also proven as we see very clearly the differences in the data between baseline and NO;NA where anonymity is removed.

While the impact of observation and individuation on the dictator game, which measures prosociality, was clear and significant, the same is not true for the prisoner's dilemma. It is worth noting that the dictator game is likely a stronger predictor of prosocial behaviour than the

prisoner's dilemma with the latter being a test for co-operation and irrational vs. rational decision-making as well. That being said, the lack of similar results for the prisoner's dilemma, which does also test prosociality to some extent, is interesting.

While the data was not statistically significant, there were indeed interesting trends across treatments. For example, the likelihood of co-operating vs. defecting was higher across all treatments than the Control. Additionally, the likelihood of co-operating was quite similar across all observation treatments, though not as high as under NO;NA.

This trend suggests that further research on the impact of each of the observation treatments on prosocial behaviour may be a potential area of interest. Testing the same treatments with the prisoner's dilemma with a sample beyond university students, with a larger sample, and perhaps in a different geographical climate, may all be items to consider for further study. While randomization was successfully proven, the sample cannot be entirely representative of a larger, more global sample.

It is also prudent to note the lack of effect that observation and individuation seem to have on risk preferences. The data found for the Holt-Laury Assessment show no significant differences in switch points across treatments.

While not statistically significant, an interesting observation is that the highest minimum acceptable offer across all treatments for the ultimatum game was under the Control group. This may indicate that a lack of observation and the maintenance of anonymity are correlated with stronger attitudes towards inequity aversion, or at least, the likelihood to report it.

With the ultimatum game, it is also interesting to note that the upper limit is consistent across all treatments with observation. Again, while not statically significant, this may warrant further exploration of the connection between observation and prosociality. Further and more rigorous study on the differences between treatment types (i.e., livestream, recording, in-person etc.) may also be an interesting niche for further exploration.

Ultimately, this study proved that observation and individuation do in fact have an impact on prosocial behaviour as defined by the offers made in the dictator game. Exploring how these treatments impact other measures of prosociality would be a fantastic next step to continue unearthing just how prone human decision-making is to the desire to fit in. The implications of understanding such a profound connection are numerous, being of interest to entities such as the government, corporations, and more.

ENDNOTES

1. (Thaler et al., 2008)
2. (Kahneman et al., 2018)
3. (O'Connell & Staff, 2021)
4. (Calvo-Gonzalez et al., 2018)
5. (Schroeder & Graziano., 2015)
6. (TEEL, 2022)
7. (TEEL, 2022)
8. (University of Toronto, 2019)
9. (Kee et al., *Does eye-tracking have an effect on economic behaviour?* 2020)
10. (Caprara et al., 2005)
11. (Sinclair et al., 2012)
12. (TDL, 2021)
13. (World Leaders in Research-Based User Experience, 2018)
14. (Hoffman et al., 1996)

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A SESSION TIMELINE

Introduction – 15 mins

Participant Check-In – 5 mins

Introductory Letter – 5 mins

Consent Forms – 5 mins

Games – 20 mins

Game 1 – 5 mins

Game 2 – 5 mins

Game 3 – 5 mins

Game 4 – 5 mins

Conclusion – 20 mins

Questionnaire – 5 mins

Debrief – 5 mins

Compensation – 10 mins

B INTRODUCTORY LETTERS

VERSION: C AND NO;NA

Instructions

Welcome

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Withdrawal Clause

If you wish to withdraw your data after the session is complete, all data will be destroyed, including choices made during the scenarios and your responses to the post-experiment questionnaire.

Please note that you may withdraw from this study at any time. Should you wish to withdraw from participation after reading the consent form, you may do so. You will not be compensated if you decide to withdraw prior to the start of the study.

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The choices made by participants will be electronically observable via camera as the session will be livestreamed.

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C CONSENT FORMS

VERSION: C and NO;NA

Participant Consent Form

Investigator: Ruhani Walia (647-280-6410; ruhani.walia@mail.utoronto.ca)

Faculty Supervisor: Professor Gazzale (416-978-2123; robert.gazzale@utoronto.ca)

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CONSENT: I have read the above information and have received answers to any questions I asked. I understand that I am entitled to receive a copy of this consent for my records. I consent to take part in the study.

_____	_____	_____
Name of Participant	Signature	Date

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Name of Investigator	Signature	Date

VERSION: YO;NA;IP

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D SESSION SCHEDULE

	M	T	W	T	F
Week 1	-	-	-	Pilot Session: YO;NA;R	-
Week 2	-	YO;NA;R	NO;NA YO;NA;IP	YO;NA;L C	YO;NA;R YO;NA;L
Week 3	YO;NA;IP	C NO;NA			

E SESSION SCRIPT (MASTER)

2:00-2:10pm

As people come in, ask them to:

1. *Write their name and initial next to it*
2. *Show some ID*
3. *Pick an identifier*
4. *Take a seat at a station with a pencil*
 - a. *Note their identifier and workstation*
5. *Will be starting soon. If past 2:00pm, tell them when.*

2:10-2:15pm

Introductory Letter

1. *Put up sign.* Hello and welcome everyone to this experiment on decision-making.
2. **If all 8 participants show up, skip to 5.**
3. **If more than 8 participants arrive (wait to do identifiers):** This session can only run with 8 participants at a time. As was noted in the recruitment email, some alternates were recruited for this experiment. Since we do have more than 8 participants here, I will have to send **x** of you home. Those subjects who are not involved will receive a bump payment, which is equivalent to the “show-up” fee of \$5 and can leave the lab immediately thereafter. Would **x** of you like to take the \$5 and leave? *If no one volunteers then: Since we have no volunteers, I am going to have to randomly drop **x** people. To do this, I will pick a number between 1 and 20 and write it down on this piece of paper. I will get each of you to say a number between 1 and 20 out loud. The person who is farthest away from it will be asked to leave.*
4. **If less than 6 participants arrive:** Since we have fewer than 6 participants here, the session today will be cancelled. Thank you all for coming, and I encourage you to sign-up for another session of this experiment.
5. To start, I’ll ask that any personal belongings be stowed beneath your tables. I will also ask that everyone please silence their phones and keep them out of sight for the duration of the session.

6. **Control:** The piece of paper you picked when you signed-in is your identifier. This will be used to anonymously link you to your choices throughout the session. Your compensation will be given to you in an envelope labelled with your identifier at the end of the session.
7. **All others:** The piece of paper you picked when you signed-in is your identifier. This will be used to link you to your choices throughout the session. I will know what your choices are in order to calculate your compensation, which will be given to you in an envelope labelled with your identifier at the end of the session.
8. I will now hand out the introductory letter. I will read it out loud and ask that you follow along.
9. *Hand out the introductory letter. Read the introductory letter.*

2:15-2:20pm

Consent Form

10. I will now hand out the consent form and ask each of you to read it over and sign at the end. If anyone has any questions, now or throughout the session, please raise your hand so that I can answer it privately.
11. *Hand out consent forms.* I will give you all about two minutes to do this and then I will collect your forms.
12. *Double check identifier workstation matches.*
13. *Collect forms. **Make sure everyone has signed.** If any participant asks for a copy, provide them with a second form and sign that as well.*

2:20-2:45pm

Game Introduction

1. That's everything on the administrative side. Now, we will begin the activities.
2. For each of the four activities that you will complete today, you will be randomly paired with another participant in this room. You will not know who your partner is, and your partner will randomly change each game.
3. For each activity, you will receive three things: an instruction sheet, a comprehension check, and a choice sheet. I will ask you not to turn over any documents I hand out until I have said so.
4. I will read the instruction sheet aloud and ask that you follow along.
5. You'll then have an opportunity to ask me any questions in private by raising your hand.
6. After that, I will ask you to complete the comprehension check. This will be one or two simple questions about the game to make sure that you understand the instructions.

7. After I review that these are done correctly, everyone will fill out the choice sheet.
8. **If C, NO;NA, YO;NA;IP:** With all of that, we will now begin the first activity.
9. **If YO;NA;L OR YO;NA;R:** Now that everyone has consented, we will begin the **livestream/recording** and then start the first activity. Please keep your chair back and your clipboard in view of the camera. *Go around to help people adjust chairs.*

Dictator Game (5 mins)

1. I will now hand out the materials for this activity. Please do not flip anything over until I have said so.
2. *Hand out materials facedown.*
3. Please now flip over the papers.
4. *Read instructions.*
5. Please now complete the comprehension check. I will come around in a moment to check that these are done correctly.
6. *Check comprehension check sheets.* If I have reviewed your comprehension check, please fill out your choice sheet and make sure to indicate your identifier.
7. **YO;NA;L and YO;NA;R:** Ensure that you use the clipboard and keep your sheet within view of the camera.
8. **YO;NA;IP:** I will be coming around to record your decisions. *Collect sheets also.*
9. *After 1 minute, collect all choice sheets. Make sure identifiers are added.* Please place your choice sheet in the bin as I come around. *Leave instructions.*

Holt-Laury Assessment (10 mins)

*need numbered chips + table choice sheets

1. I will now hand out the materials for this activity. Please do not flip anything over until I have said so.
2. *Hand out materials facedown.*
3. Please now flip over the papers.
4. *Read instructions.*
5. Please now complete the comprehension check. I will come around in a moment to check that these are done correctly.
6. *Check comprehension check sheets.* If I have reviewed your comprehension check, please fill out your choice sheet and make sure to indicate your identifier.
7. **YO;NA;L and YO;NA;R:** Ensure that you use the clipboard and keep your sheet within view of the camera.
8. **YO;NA;IP:** I will be coming around to record your decisions. *Collect sheets.*
9. *After 1 minute, collect all choice sheets. Make sure identifiers are added.* Please place your choice sheet in the bin as I come around. *Leave instructions.*
10. This bag has 10 chips numbered 1 through 10. I will have someone pick a chip to determine which decision number everyone will be paid for. Can I have a volunteer?
11. *Volunteer chooses a chip for the paid decision number.*
12. I will now ask someone else to pick a chip to determine whether left or right happens for everyone. Can I have a volunteer?
13. *Volunteer chooses a chip for left / right.*
14. *Note decision number and left or right. Highlight winnings on each sheet.*

Prisoner's Dilemma (5 mins)

1. I will now hand out the materials for this activity. Please do not flip anything over until I have said so.
2. *Hand out materials facedown.*
3. Please now flip over the papers.
4. *Read instructions.*
5. Please now complete the comprehension check. I will come around in a moment to check that these are done correctly.
6. *Check comprehension check sheets.* If I have reviewed your comprehension check, please fill out your choice sheet and make sure to indicate your identifier.
7. **YO;NA;L and YO;NA;R:** Ensure that you use the clipboard and keep your sheet within view of the camera.
8. **YO;NA;IP:** I will be coming around to record your decisions. *Collect sheets also.*
9. *After 1 minute, collect all choice sheets. Make sure identifiers are added.* Please place your choice sheet in the bin as I come around. *Leave instructions.*

Ultimatum Game (5 mins)

1. I will now hand out the materials for this activity. Please do not flip anything over until I have said so.
2. *Hand out materials facedown.*
3. Please now flip over the papers.
4. *Read instructions.*
5. Please now complete the comprehension check. I will come around in a moment to check that these are done correctly.
6. *Check comprehension check sheets.* If I have reviewed your comprehension check, please fill out your choice sheet and make sure to indicate your identifier.
7. **YO;NA;L and YO;NA;R:** Ensure that you use the clipboard and keep your sheet within view of the camera.
8. **YO;NA;IP:** I will be coming around to record your decisions. *Collect sheets also.*
9. *After 1 minute, collect all choice sheets. Make sure identifiers are added.* Please place your choice sheet in the bin as I come around. *Leave instructions.*

2:45-3:00pm

Conclusion (Questionnaire, Debrief, Compensation)

1. The four activities for this experiment are now complete. Thank you all for your time.
2. **YO;NA;L:** I will now be ending the livestream. Each of you can close the camera tab.
3. **YO;NA;R:** We will now be ending the recording. Please hit stop on your recording.
Check that they've all stopped.
4. In this bag, there are three chips, labelled 1, 2, and 3. As was explained at the beginning of the study, your compensation will include the show-up fee, your earnings from the **first/last (HL) activity**, and one of the remaining three games.
5. To decide which of those three games you will be compensated for, I will have someone pick one of the chips. 1 will indicate the dictator game. 2, the prisoner's dilemma, and 3 the ultimatum game. Can I have a volunteer?
6. *Volunteers picks game number chip.*
7. I will now hand out a questionnaire that should take around 5-7 minutes to complete. Please do not write anything where it says Form Number.
8. *Hand out the questionnaire.* Once you are done, please remain seated until I have come around to collect everyone's sheets and so that we may debrief. After debriefing, you will be compensated and then free to go.
9. *As questionnaires are being completed, calculate compensation. After 7 minutes, collect and hand out debrief form.*
10. Each of you has now received a debrief form. Please give it a read and let me know if you have any questions. Thank you all for your participation. The experiment is now complete. In a few moments, you will receive your compensation, then you are free to go.
11. Before you leave, please make sure that you are not taking any of the materials from the session with you except for your compensation envelope. If you would like a copy of the results of the experiment, you may also take the debrief form as it has my email on it.
12. **Control:** *Place all envelopes on a table.* Your earnings from this session are in an envelope labelled with your identifier. I'll ask you all to come up to the front now to collect your envelope.
13. **All other groups:** I will now call out your identifiers and ask you each to come to the front to receive your compensation.

F ORDER OF GAMES

Order of Activities

*To make understanding payments easier, half of the sessions will play Holt-Laury first, and half will play it last.

Session	Order	Session	Order
1	2, 4, 3, 1	6	3, 4, 1, 2
2	1, 3, 4, 2	7	2, 4, 1, 3
3	2, 3, 4, 1	8	3, 1, 4, 2
4	4, 1, 3, 2	9	2, 3, 1, 4
5	2, 1, 4, 3	10	1, 4, 3, 2

1 = Dictator Game, 2 = Holt-Laury, 3 = Prisoner's dilemma, 4 = Ultimatum Game

G GAME INSTRUCTIONS

The procedure for all activities is described below. Differences between treatments are highlighted in blue.

Control and NO;NA

**note that the game procedure for these treatments is the same because the only difference between C and NO;NA is removing anonymity in the latter, and this is achieved through the compensation structure described earlier.*

1. Participants are given a copy of the instruction sheet, choice sheet, and comprehension check (all face down).
2. Participants are asked not to begin reading the materials until I have said so.
3. After everyone receives a copy, I ask all participants to flip over the materials.
4. I begin reading the instruction sheet aloud and ask everyone to follow along.
5. I then ask everyone to complete the comprehension check and not to complete the choice sheet until I have reviewed their comprehension check.
6. After a few moments, I go around to make sure that these are done correctly and answer any questions.
7. I then ask everyone to complete their choice sheet and to ensure that they write their identifier on it.
8. After a few moments, I collect all the choice sheets.
9. I tally endowments on my tracking sheet.

YO;NA;IP

1. Participants are given a copy of the instruction sheet, choice sheet, and comprehension check (all face down).
2. Participants are asked not to begin reading the materials until I have said so.
3. After everyone receives a copy, I ask all participants to flip over the materials.
4. I begin reading the instruction sheet aloud and ask everyone to follow along.
5. I then ask everyone to complete the comprehension check and not to complete the choice sheet until I have reviewed their comprehension check.
6. After a few moments, I go around to make sure that these are done correctly and answer any questions.
7. I then ask everyone to complete their choice sheet and to ensure that they write their identifier on it.
8. *After a few moments, I go around to each station and ask subjects to tell me their decision aloud so that I may enter it into my laptop. I then collect their choice sheet before moving on to the next workstation.*
9. I tally endowments on my tracking sheet.

YO;NA;L and YO;NA;R

**note that the game procedure for these treatments is the same because the only difference*

between them is the webcam set-up; in YO;NA;L the webcams are set to livestream and in YO;NA;R the cameras are recording.

1. Participants are given a copy of the instruction sheet, choice sheet, and comprehension check (all face down).
2. Participants are asked not to begin reading the materials until I have said so.
3. After everyone receives a copy, I ask all participants to flip over the materials.
4. I begin reading the instruction sheet aloud and ask everyone to follow along.
5. I then ask everyone to complete the comprehension check and not to complete the choice sheet until I have reviewed their comprehension check.
6. After a few moments, I go around to make sure that these are done correctly and answer any questions.
7. I then ask everyone to complete their choice sheet, to ensure that they write their identifier on it, and that they keep their choice sheet within view of the webcam.
8. After a few moments, I collect all the choice sheets.
9. I tally endowments on my tracking sheet.

All game materials are included below.

DICTATOR GAME

In this scenario, each Chooser is matched with a Recipient. There is \$8. **The Chooser decides how many dollars to keep.** The Recipient gets whatever remains of the \$8.

For this task, each of you is both a Chooser and a Recipient.

When you make your decision as a Chooser, you are randomly matched with one other person in this room, who is the Recipient in your decision. You do not know who this other person is, nor will you find out.

You are also the Recipient of someone else's Chooser decision. You do not know who this other person is, nor will you find out.

Note that the person you are randomly matched with as a Chooser is not the same as the person you are randomly matched with as a Recipient. The matching for this task was done at random, so your match in this task may or may not be the same as your match in any other task.

In a moment, I will ask you to make your decision as a Chooser. Before I do, I am going to ask you a couple of questions to make sure that you understand the instructions.

DG: COMPREHENSION CHECK

1. As a Chooser, what choice would maximize your own payoff?

Circle one: \$0 \$8

2. As a Chooser, what choice would maximize the Recipient's payoff?

Circle One: \$0 \$8

DG: CHOICE SHEET

Identifier: _____

How many dollars do you choose to keep? (Please enter a whole number between \$0 and \$8.): _____

HOLT-LAURY GAME

Alongside this instruction sheet, you have just been given a choice sheet with 10 decisions. In a few moments, for **each** decision, you will indicate whether you choose Option A or Option B.

At the end of the experiment, **one** of the 10 decisions will be randomly selected, and you will be paid only for that decision. For each decision, your earnings depend on (1) whether you chose Option A or Option B and (2) whether “Left” or “Right” occurs.

If, for the randomly selected decision, you chose Option A, you would earn \$2 if “Left” happens and \$1.60 if “Right” happens. If you chose Option B, you would earn \$3.85 if “Left” happens and \$0.10 if “Right” happens. On the choice sheet, you will notice that the chance of “Left” and “Right” changes systematically from decision to decision. That is, for decision 1, there is a 1 in 10 chance of “Left.” For decision 2, there is a 2 in 10 chance of “Left”; for decision 3, a 3 in 10 chance of “Left,” etc. For decision number 10, “Left” will always happen.

CHOOSING THE DECISION NUMBER

To select the decision for which you will be paid, I will present you with a bag of 10 chips numbered 1 through 10. You will choose 1 chip out of this bag. The number on the chip is the decision number for which you will be paid. For example, if you choose a chip with the number 6 on it, you would be paid for decision number 6. Note that each decision has a 1 in 10 chance of being chosen.

DETERMINING LEFT OR RIGHT

After the decision number is randomly selected, “Left” or “Right” will be determined according to the probabilities listed on the choice sheet. For example, let us assume decision number 6 is randomly chosen. There is a 6 in 10 chance of “Left”, and a 4 in 10 chance of “Right”. I will present you with a bag of 10 chips numbered 1 through 10. You will choose 1 chip out of this bag. If the chip you choose is numbered 1 through 6, “Left” happens. If the chip you choose is numbered 7 through 10, “Right” happens.

For each of the 10 decisions, please indicate whether you choose Option A or Option B.

HL: COMPREHENSION CHECK

What do your earnings depend on?

- what decision number is chosen
- whether you chose Option A or B
- whether Left or Right happens
- all of the above

Choice Sheet

Number:

Decision Number	OPTION A		OPTION B		Your Choice	
	"Left"	"Right"	"Left"	"Right"	(Circle 1 Option Per Row)	
1	1/10 chance of \$2.00	9/10 chance of \$1.60	1/10 chance of \$3.85	9/10 chance of \$0.10	Option A	Option B
2	2/10 chance of \$2.00	8/10 chance of \$1.60	2/10 chance of \$3.85	8/10 chance of \$0.10	Option A	Option B
3	3/10 chance of \$2.00	7/10 chance of \$1.60	3/10 chance of \$3.85	7/10 chance of \$0.10	Option A	Option B
4	4/10 chance of \$2.00	6/10 chance of \$1.60	4/10 chance of \$3.85	6/10 chance of \$0.10	Option A	Option B
5	5/10 chance of \$2.00	5/10 chance of \$1.60	5/10 chance of \$3.85	5/10 chance of \$0.10	Option A	Option B
6	6/10 chance of \$2.00	4/10 chance of \$1.60	6/10 chance of \$3.85	4/10 chance of \$0.10	Option A	Option B
7	7/10 chance of \$2.00	3/10 chance of \$1.60	7/10 chance of \$3.85	3/10 chance of \$0.10	Option A	Option B
8	8/10 chance of \$2.00	2/10 chance of \$1.60	8/10 chance of \$3.85	2/10 chance of \$0.10	Option A	Option B
9	9/10 chance of \$2.00	1/10 chance of \$1.60	9/10 chance of \$3.85	1/10 chance of \$0.10	Option A	Option B
10	10/10 chance of \$2.00	0/10 chance of \$1.60	10/10 chance of \$3.85	0/10 chance of \$0.10	Option A	Option B

PRISONER'S DILEMMA

For this task, you are randomly matched with someone in this room whom we will simply call "the other" in the instructions below. You do not know who this other person is, nor will you find out. The matching for this task was done at random, so your match in this task may or may not be the same as your match in any other task.

You and the other both choose between two options, A and B. You choose without knowing the other's choice. Your own and the other's payment depends on the combination of your choices as follows:

- If both of you choose A, you both get \$5.
- If you choose A and the other chooses B, you get \$0 and the other gets \$10.
- If you choose B and the other chooses A, you get \$10 and the other gets \$0.
- If both of you choose B, you both get \$3.

In a moment, I will ask you to make your choice. Before I do, I am going to ask you a couple of questions to make sure that you understand the instructions.

PD: COMPREHENSION CHECK

1. If you chose A, what is your payoff if the other chose B? Circle one.

\$0 \$3 \$5 \$10

2. If you chose B, what is your payoff if the other chose A?

\$0 \$3 \$5 \$10

PD: CHOICE SHEET

Identifier: _____

Which option do you choose?

- Option A
- Option B

ULTIMATUM GAME

In this scenario, each Proposer is matched with a Responder. There is \$8. **The Proposer chooses how many dollars to keep.** The Responder gets whatever remains of the \$8. This is the Proposer's *offer* to the Responder.

The Responder chooses whether to accept or reject the Proposer's offer. The Responder chooses which offers to accept and which to reject before finding out the Proposer's actual offer. That is, the Responder chooses the minimum acceptable offer that they are willing to accept. If the offer made by the Proposer is above or equal to the minimum acceptable offer, the offer is accepted. If the offer is smaller than the minimum acceptable offer, the offer is rejected.

- If the Responder *accepts*, then the \$8 is divided as indicated in the offer.
- If the Responder *rejects*, then both the Proposer and the Responder get \$0.

For this task, each of you is both a Proposer and a Responder.

When you make your choice as a Proposer, you are randomly matched with one other person in this room, who is the Responder in your decision. You do not know who this other person is, nor will you find out.

You are also the Responder in someone else's Proposer decision. You do not know who this other person is, nor will you find out.

Note that the person you are randomly matched with as a Proposer is not the same as the person you are randomly matched with as a Responder. The matching for this task was done at random, so your match in this task may or may not be the same as your match in any other task.

In a moment, I will ask you to make your choices. Before I do, I am going to ask you a couple of questions to make sure that you understand the instructions.

UG: COMPREHENSION CHECK

1. If the Proposer offers \$5 out of the \$10 to the Responder and the Responder's minimum acceptable offer is \$6, how much does **the Responder** earn? Circle one.

\$0 \$5 \$6 \$11

2. If the Proposer offers \$7 out of the \$10 to the Responder and the Responder's minimum acceptable offer is \$4, how much does **the Proposer** earn?

\$0 \$3 \$4 \$7

UG: CHOICE SHEET

Identifier: _____

As the Proposer, how many dollars do you choose to offer to the Responder? (Please enter a whole number between \$0 and \$8.): _____

As the Responder, what is your minimum acceptable offer? You will be randomly matched with an offer from a Proposer. If that offer is less than your minimum, you will reject it. If it is above or equal to your minimum, you will accept. (Please enter a whole number between \$0 and \$8.): _____

H POST-EXPERIMENT QUESTIONNAIRE

See questionnaire here: <https://docs.google.com/document/d/14aT-SBX4vQf9U6VNk4w8QX8o43jCrmMoOgQtOTZ1obo/edit?usp=sharing>

I DEBRIEF FORM

Title: DM11

Investigator: Ruhani Walia (647-280-6410; ruhani.walia@mail.utoronto.ca)

Faculty Supervisor: Professor Gazzale (416-978-2123; robert.gazzale@utoronto.ca)

Your generosity and willingness to participate in this study is greatly appreciated. Thank you for your participation.

At the beginning of the study, you were informed that this research study did not involve any deception; that anything we told you was true would in fact be true. Now that the study is over, we would like to take this opportunity to confirm that there was no deception in this session.

We also want to confirm that your data will be used in an anonymized way, and we will never share with others any information that identifies you.

Please do not disclose research procedures and/or purpose to anyone who might participate in this study in the future as this could affect the results of the study.

After the data from these research sessions have been analyzed, the researcher will prepare a summary of the research results. Please email the investigator if you would like to receive a copy of any publications when completed.