2022

The Relationship Between Adherence to COVID-19 Regulations and The Public Goods Game

Taylor Blaze Clark

The Relationship Between Adherence to COVID-19 Regulations and The Public Goods Game

Taylor Clark

Economics

University of Vermont

Abstract

Can someone's willingness to contribute to a public good or charity be associated with their attitudes and behavior towards COVID-19 regulations? This experimental economics paper examines the connection between cooperation with regulations and charitable giving using a public goods game. While many studies have looked at what affects contributions in public goods games and many others have examined charitable givings outside the laboratory setting, few studies have examined if and how contributions in a public goods game and outside the laboratory setting are related.

The COVID-19 Pandemic created a unique opportunity to study the relationship between subjects' decisions inside and outside the public goods game. Subjects' attitudes and behavior toward COVID-19 protocols were measured using a survey that asked them about their attitudes and behavior toward various situations that could arise during the Pandemic. Willingness to contribute to public goods and charities were measured using a public goods game, which utilized veconlab's Experimental Economics website. The answers given in the survey and the actions in the public goods game were compared to determine if there is a relationship between the willingness to contribute in a public goods game and one's desire to contribute to lower levels of COVID-19 circulation.

This study finds a relationship between peoples' actions inside and outside the laboratory. However, this paper finds a significant negative relationship between subjects' behaviors towards COVID-19 outside the laboratory and their actions inside the laboratory. In contrast, there is a mostly significant positive relationship between peoples' attitudes towards COVID-19 and their actions inside the laboratory.

Introduction

This project addresses whether an association exists between one's willingness to contribute to a public good in the public goods game and outside the laboratory by adhering to COVID-19 protocols. The main goal of this research project is to see if the results from public goods games can predict peoples' actions outside the laboratory when it comes to contributing or not to a public good. This Pandemic has created an opportunity to look at if and how the provision of decreasing the risk of COVID-19 and the public goods game are associated with each other. It is important to understand if and how the public goods game can predict peoples' actions regarding public goods outside the laboratory setting and few studies have investigated this relationship thus far. Public goods games started being conducted to create a simplified and controlled environment similar to public goods outside the laboratory and study peoples' behaviors towards them, meaning their contributions or lack thereof to public goods. This study looks to see if the laboratory public goods game can be used to predict peoples' actions outside the laboratory setting.

The public goods game measures subjects' willingness to contribute to a public good inside the laboratory. Subjects' contributions outside the laboratory were measured using a survey that asked subjects about their attitudes and behaviors towards COVID-19 guidelines. Subjects' behaviors towards COVID-19 were measured using questions about their willingness to contribute to lower levels of COVID-19 circulation by wearing a mask, social distancing, and getting vaccinated outside the laboratory. Subjects' attitudes towards COVID-19 were measured using questions about what they would do in hypothetical situations or how they would advise someone they knew in certain situations. Subjects' attitudes and behaviors were then compared to their contributions to a public good in the public goods game played on veconlab

Experimental Economics website to determine if ones attitudes and behaviors towards COVID-19 could be predicted using their actions during a public goods game.

A public good is a good that is non-rival, meaning that one's consumption of the good does not affect another's. A public good is also non-excludable because it is difficult and sometimes impossible to keep non-payers from consuming it, making it challenging to keep people from consuming the good for any reason. Therefore, it is challenging to fund public goods, especially by a private business. Once provided, consumers can freeride by consuming the public good without paying for it. An example of this is national defense because one portion of the population cannot be defended while the rest is unprotected. Due to the public goods being non-rival and non-excludable, it is predicted that rational people will not contribute to the public goods and will free ride, but people do not tend to free ride as researchers had hypothesized.

A public goods game was developed to study peoples' choices about providing a public good in a controlled and simplified setting. In a simple public goods game, subjects are endowed with a predetermined number of tokens and they choose how much to donate to the provision of the public good. The amount contributed is then multiplied by a factor and divided equally among the subjects, regardless of the subject's contribution. Multiple rounds of this are done with the same group of subjects, who will get the same amount of tokens bestowed to them each round. Each round is similar to receiving a new paycheck where subjects need to allocate to two different things. There is a trade-off because a subject can keep the resources they did not contribute, and there is no guarantee that the other subjects will also contribute to the public good. This game is meant to measure contribution between a group of subjects because it is in a subject's best interest to freeride, contributing nothing, while others contribute to the public good. However, the group does benefit from contribution because the group's contribution is

multiplied by a factor, such as two or three, and distributed equally among group members, creating a net gain.

For example, four subjects are placed in a group. Each player is endowed with 10 tokens, and three subjects contribute 5 tokens to the public good, while the other subject contributes nothing, so there is a total of 15 tokens contributed. The 15 tokens contributed to the public fund are multiplied by 2 to have a total of 30 tokens in the public fund to be distributed to all four players. After being distributed equally among the four subjects in the group, three of the subjects will have 12.5 tokens because they kept 5 tokens they did not contribute and received 7.5 tokens as a ¼ share of the 30 total tokens in the public good. The subject who did not contribute will have 17.5 tokens because they kept the 10 tokens they started with and gained 7.5 tokens from the ¼ share of the 30 total tokens in the public good.

In this example, there is a net and an individual benefit because the total tokens in the group increased, and the number of tokens each player finished the round with increased from their initial endowment. Still, the subjects who contributed five tokens are less well off than the player who did not contribute. The person who did not contribute got the highest payoff by free riding, letting others contribute while reaping the benefits of their other group members' contributions. There is an individual incentive to freeride, which subjects begin to realize throughout the experiment as the total contributions to the public good generally tend to decrease from one round to the next.

The risk of virus circulation is a public good because it is both non-excludable and non-rival. One person's consumption of the level of risk does not affect another's, and it is challenging to keep people from consuming the level of risk, even if they have not undertaken the costs of decreasing the risk. The COVID-19 vaccination, wearing masks, and social

distancing are costs associated with the level of the public good, decreasing circulation of COVID-19. People can choose to pay the price to reduce the circulation of COVID-19 or not while still reaping the benefits of others doing so, and the one person's consumption of the level of risk of COVID-19 is not affected by another's consumption.

The following section will explain existing literature on the research that has already been conducted in relation to this research study. After the literature review, the methodology of this study is explained, which is followed by the results of the study. There is then a discussion of the results and concluding remarks are made about the study, which includes further research that could be conducted on the topic.

Literature Review

Results in Standard Public Goods Games

The public goods game has been used to study cooperation under various circumstances in a controlled and abstract environment (Marwell and Ames, 1980; Andreoni, 1988). Many have theorized the free-rider hypothesis (Andreoni, 1988). However, it has been discovered in the early stages of a game that subjects usually contribute between 30 and 70 percent of their total endowment instead of the hypothesized 0 percent (Ledyard, 1995). Marwell and Ames also added to the literature in 1980, showing that groups would typically invest 57% of their resources, which was 28% more than was needed to reach a provision point, meaning that subjects do not fit the predicted free rider hypothesis (1980). Even when Marwell and Ames also increased subjects' endowments and studied experienced subjects, who had already participated in a public goods game, they found that subjects tended to free ride less than expected (1980). Early experiments found that subjects were not acting as experimenters had theorized rational,

self-interested subjects would act by contributing nothing to the public good (Marwell and Ames, 1980).

Three different types of subjects have been identified: free riders, unconditional cooperators, and reciprocators (Chaudhuri, 2011). Free riders do not contribute to gain from others' contributions to the public good (Chaudhuri, 2011). Unconditional cooperators contribute to the public goods, whether or not the others in their group also contribute (Chaudhuri, 2011). Finally, reciprocators' contribution to the public good is conditional or dependent on others' contributions (Burlando, 2005; Chaudhuri, 2011). Urs Fischbacher and Simon Gachter also found that this group of subjects contains '"imperfect conditional cooperators' who only partly match others' contributions" (2010, p. 3), which can explain why contributions decline over time (2010). James Andreoni finds that the learning hypothesis could also explain why there is a general decline in contributions because subjects learn the free-rider incentive by participating in the game (1988). However, his experiment shows that subjects continue to contribute to the public good even after understanding the free-rider incentive, so learning alone cannot explain the general decline in contributions (1988). Many experiments have expanded on this knowledge and manipulated the game to represent various circumstances subjects may encounter outside the laboratory.

The Effect of Personality Traits and Personal Values on Choices in Public Goods Games

Researchers have expanded on the basic public goods games to look at how personality traits and personal values can explain subjects' choices within public goods games. A study was done by Stefan Volk et al. (2011), which looked at individual differences in personality traits and personal values, and subjects' contribution in the public goods game and found that agreeableness was a strong predictor of cooperation and contribution. Agreeableness is one of

the Big Five personality traits, which describes someone who gets along well with others, is optimistic, friendly, and warm. Their results also suggest that subjects with weak social values tend to free ride in the public goods game. Researchers also found that "personal values did not uniquely contribute to the prediction of the cooperation preferences above and beyond what was already accounted for in personality" (p. 814).

Many people exhibit social preferences, such as reciprocal fairness, so they are not only motivated by material self-interest or the monetary payoff they will receive at the end of the game (Fehr and Fischbacher, 2002; Englmaier and Gebhardt, 2011). Simon Anderson states that the conflicting interest that may affect subjects' actions are their "care about how well they do relative to others (envy, fairness), or about how well others do (altruism), or they may be risk-averse" (1998). Urs Fischbacher and Simon Gachter found that subjects tend to contribute more than predicted "not solely due to inexperience but to social preferences" (2006, p. 33).

Social desirability is the desire to present oneself positively, so people tend to overreport positive characteristics and under-report negative traits (Fleming and Zizzo, 2011). Piers Fleming and Daniel Zizzo tried to explain why people often contribute to the public good even when it is not in their best interest by looking at social norms and preferences. They found that subjects interested in being socially desirable contributed more to the public good. In contrast, others not as interested in social desirability did not contribute as much.

Other studies have taken advantage of people's desire to perceive themselves positively to others to increase contributions. James Andreoni and Ragan Petrie (2004) used visual identification and information about subjects to decrease anonymity between group members and increase cooperation and contribution. Neither identification nor information about subjects had a significant effect on their own, but they had a significant impact when put together. Subjects

contributed all their tokens at least 20% of the time and decreased freeriding. This can be applied to the real world, where contributions to charities are either recognized or kept anonymous, and in the COVID-19 Pandemic when wearing masks in public was mandated. Outside the laboratory, people often act cooperatively when their contributions or lack thereof are more public (Reindl et al., 2019, 73). Peoples' contribution to the level of risk of virus circulation by wearing face coverings in public was very publicized during the Pandemic, just as the contributions to the public good in this game were also publicized through identification and information. This could explain why increased cooperation might have decreased the risk of virus circulation because it was easy to identify contributors and free riders.

Connecting Choices in Public Goods Games to Behavior Outside the Lab

Although the research on the relationship between subjects' actions inside and outside the laboratory is relatively recent, some have generally found a correlation between subjects' behavior inside and outside the public goods game. An experiment done by Florian Englmaier and Georg Gebhardt (2011) found that subjects' behavior in the experiment did correlate with their behavior outside the game in the field. The field experiment used a group of four clerks, who earned a fixed wage, and given an opportunity to freeride by leaving after their entire group had entered a pre-specified number of books into a computer system. Due to the fact that entries were counted on a group instead of individual basis, some clerks could enter fewer books into the system, while others did most of the work, and then leave after the group's daily goal was reached. When comparing clerks' contribution in the public goods experiment and the field experiment, they found that even though it is hard to predict behavior based on information about personality traits, using public goods game contributions as a measure of a personality trait provided is a stronger correlation, which allows for better prediction of behavior outside the

public goods experiment. They concluded that this experiment was a good starting point for extrapolating from the public goods game experiment to the field and the real world, but extrapolation is not always viable.

In contrast, Matthias Benz and Stephan Meier (2008) found in a long-term study that tracking contributions in the field and the game over multiple semesters, there was a relatively weak correlation when accounting for singular situations. There are significant variations in behavior. The field experiment examined students from the University of Zurich and their decision to donate to two different charities when they filled out the registration renewal. This data was compared to students' choices in a simple public goods game experiment. However, considering past behavior yields a higher correlation. This is a testament to how much decisions are sensitive to small changes in context or situations people are placed in inside and outside the game. They conclude that "individual's behavior is situationally dependent and challenging to generalize" (p. 277); however, there is some correlation, between 0.25 and 0.4, which they find to be relatively high given the circumstances of what they were measuring.

Another study, done more recently by Reindl et al. (2019), also found that subjects who free rode in the public goods game were significantly more likely to freeride in the field. This study was done in a class with business administration students at the University of Vienna, who took part in three group projects in groups of three to five students over a semester. At the end of the course, subjects were asked to complete a survey about group participation, so participation was somewhat challenging to measure subjectively. In the experiment, 19.8% of subjects were identified as free-riders whose contributions were below average when considering the quality of their work and the time they put into it. When asked to donate to a public good or charity, 66.9% of the identified free riders were unwilling to donate, 14% were willing to donate half, and

19.1% were willing to contribute the total amount. They also found that an additional free rider in a group tended to cause an increase in others' contributions in an act to compensate for the free rider's low contributions.

Trends During the COVID-19 Pandemic

Since the beginning of the COVID-19 Pandemic, research has been conducted on the trends of peoples' behaviors and attitudes towards the virus, which can be used to inform the hypothesis of this research project. David Anaki and Jamie Sergay (2021) used an online convenience survey performed in March of 2020 to find that men and women are equally scared of COVID-19. Additionally, people report taking at least four preventative measures, such as washing one's hands and wearing face coverings. This survey found that between 68% and 83% of people intend to comply with health authorities, but washing one's hands, which was the highest reported preventative measure employed by subjects, was only exercised by 62% of the population (Anaki and Sergay, 2021). Using a similar online survey format, Volker Thoma et al. found that knowledge of symptoms cannot predict reported behavior (2021). Even if someone knows what the symptoms of COVID-19 are, it does not mean that they will follow recommended precautions.

Madison Stoddard and her fellow scientists used game theory to determine that non-compliance is embedded in human nature (2021). Individuals can justify not complying with COVID-19 protocols using their own perceived costs and benefits. Subjects perceive the costs and benefits of compliance and non-compliance and believe their risk of infection is lower than average. Underestimating one's level of risk leads to subjects minimizing the potential costs of non-compliance and could lead to non-compliance with COVID-19 protocols.

Buso et al. go a step further than Madison Stoddard et al. by looking at peoples' behavior during lockdowns when people are forced to self-isolate (2020). This study used a public goods game and an ultimatum game, where subjects made a simple one-time decision about their level of isolation to examine their level of cooperation. Buso found that "participants are more selfish in the ultimatum bargaining and contribute more to the public good when social isolation is stronger. However, cooperation decreases when lockdown is longer" (p. 1). They believe this is because people feel a decrease in social embeddedness.

In addition to Bruso's findings, S. van Baal finds that subjects are more likely to self-isolate as more players are infected (2021). Baal's experiment had a group of people, one of which was randomly marked as infected. The infected individual was concealed from everyone, including themselves, and subjects decided how much they wanted to isolate themselves. S. van Baal also finds that players conform to social norms by self-isolating more than the researchers predicted. When facing social dilemmas, many individuals prefer to follow examples of successful behavior rather than social norms if the two are not the same. People study what others are doing to be successful and do it themselves (Burton-Chellew, 2021).

Methodology

This study was conducted between February 24th and March 4th of 2022. At the time these sessions were run, the number of COVID-19 cases was decreasing, and had been decreasing since January 2022. Although people were still required to wear masks in buildings on the University of Vermont Campus, where participants for this study were recruited from, the mask mandate inside buildings in and around the Burlington area had been lifted and many businesses had transitioned to being mask optional. Additionally, just a week and a half after the

experimental sessions were concluded by an email on March 16, 2022, that the mask mandate would be lifted indoors as of March 19, 2022.

During this study period, participants were asked to attend a one hour research session on the University of Vermont campus. Upon subjects' arrival at the experimental session, they were provided with a small notecard containing the name of the website they would use to participate in the game, their ID number, which they would use through the session, the link to a survey participants completed at the beginning of the session, and a session name they will use to enter the online interactive game.

Once everyone had arrived, subjects were given an information sheet, which was used to establish consent with each participant before proceeding with the experimental session. The information sheet subjects were given can be found in Appendix A. Please note that the public goods game was referred to as an online interactive game throughout the experimental session, which includes all the instructions participants received. After obtaining consent from each subject, they were asked to proceed to the link listed on their notecard. They were asked to complete a survey on Google Forms consisting of questions about their attitudes and behaviors towards COVID-19 regulations. In Appendix B, the questions subjects were asked are provided. The following disclaimer was provided at the top of the survey: "Please answer the following questions as honestly as you can. No actions will be taken for any responses you provide. The responses you provide will be kept confidential", which was provided to elicit the most honest responses from participants.

After completing the survey, subjects were provided with an instructions sheet, which was read aloud to subjects. This instructions sheet can be found in Appendix C. The instructions sheet explained the public goods game procedure, the valuation scheme of tokens for both the

private and public fund, the method of payment, and an example of payoffs given various contribution levels. Each group was made up of eight participants, who remained in the same group throughout the public goods game. Each public goods game consisted of twelve rounds, where each participant received twelve tokens at the beginning of each round. Each token was valued at $1.00 if kept in the private fund. Each token contributed to the public found was multiplied by two before being divided equally between all eight group members regardless of the tokens they had contributed in the round. Consequently, the value each group member received for each token in the public fund was $0.25.

The instructions also stated that each participant would receive $6.00 for completing the session. In addition, subjects would also be compensated for one round of the public goods game chosen randomly via the roll of a die. Doing so made it unknown to participants which round they would be compensated for, meaning they would have the same incentives for each round and not act differently for the round they would be paid for (Ledyard, 1995). This is also considered standard practice in many public goods games' experiments (Ledyard, 1995).

In the example round, the number of tokens each player contributed and kept for their personal fund was displayed, as well as the total amount of tokens contributed, the amount each player received from the public fund, and their total earnings for the example round. It was also explained to participants that they would only be informed of the total number of tokens contributed to the public fund and their earnings for the round at the conclusion of each round. They would not be able to see the amount other participants had contributed, and no one would know how much they had contributed. It was also made clear during the instructions that tokens could not be transferred to other rounds.

After the instructions were read, participants were asked to complete a quiz question to demonstrate their understanding of the game and its payoff scheme. The quiz question was an iteration of the example round provided to participants previously. Players' contributions and total contributions had changed from the example round, and they need to determine players' total tokens at the end of the chosen round. Each participant had to answer the quiz question correctly before the group continued to the game setup. Participants were able to ask further questions and consult the example round to answer the questions correctly.

After all participants had answered the quiz question correctly, the group proceeded to the Online Platform Setup. Here, instructions were given about accessing the veconlab website and the online session, creating an account on the veconlab website, and making and confirming decisions once the online public goods game had begun. These instructions can be found in Appendix D. Veconlab is a site with various experimental economics simulations used for teaching and research purposes, one of which is a public goods game. Once participants had navigated to veconlab's website, they used a Session ID to log into the same group of eight people. Then they set up an account and read through instructions provided by the website about the game before proceeding to the game. It is important to note that participants used an ID number provided on the note cards they were given upon their arrival as their first name and "UVM" as their last name when creating an account. This was done to ensure participants' identities remained confidential and ensured they were comfortable making decisions knowing they would remain anonymous.

Once the game had begun, meaning that all participants had entered the session using the session ID, created an account, read the instructions provided by veconlab about the public goods game, and answered two questions asked by the website about the game, players encountered

drop-down menus that allowed them to choose how much of their endowment they wanted to contribute to the public fund and how much they wanted to keep in their personal fund. They could choose any whole number ranging from zero tokens to twelve tokens to contribute to the public fund, the rest of which would go to their personal fund. Once all group members had submitted a decision, each player was able to see the amount of total tokens contributed to the public fund, how many they chose to contribute to the public fund and keep in their personal fund as an individual, and the total dollar amount they had at the end of the round keeping each player's decision anonymous from the rest of the group.

Once all twelve rounds of the public goods game were completed, one of the participants rolled a twelve-sided die to determine which round subjects would be compensated for. Participants were then thanked for their time, receipts for each subject's payment were prepared, and payment was provided in cash after participants' receipts had been signed before they departed.

The experimental design was approved by the IRB and funded through the University of Vermont's Honors College Thesis Mini-Grant funding. This funding was used to pay subjects based on their performance in the public goods game. Compensation is an essential aspect of experimental economics papers because subjects are not compensated equally but based on how well they performed in the experiment. Paying subjects based on their performance in the game allows experimenters to simulate a more realistic situation than they would without payments based on the subject's performance in the game and incentivizes subjects to perform as they would in similar cases outside the game.

A total of 22 undergraduate students from the University of Vermont participated in this honors thesis research project. An important note for the analysis is that two subjects played the

game twice. This was done when two groups of eight were scheduled to complete the session, and many people did not show up when they were scheduled to participate. Despite overbooking the session, 14 people attended a session when 16 people were needed. Instead of turning away six participants who had shown up for the session, two participants participated in two sessions simultaneously. One of the data points from each participant was randomly selected and dropped, so they were only counted once in the results. Therefore, there were only 22 participants even though there were three groups of eight participants or 24 original data points.

Using the answers each participant provided from the COVID-19 survey questions asked at the beginning of the session, scores were given to each participant for their attitudes and behaviors towards COVID-19. Due to the fact that everyone in the sample was vaccinated and had received their COVID-19 booster shots, questions 2 and 3 were not used in the analysis as they would not have affected the results by helping identify contributors and free riders.

Questions 5, 6, 7, and 8 were asked to determine subjects' behaviors during the COVID-19 Pandemic. These questions are as follows:

5. Do you wear a mask when you are required to?
    a. Yes, all the time.
    b. Yes, most of the time.
    c. Sometimes.
    d. No

6. Do you wear a mask indoors when you are not required to?
    a. Yes
    b. Most of the time
    c. Sometimes
    d. No

7. Do you wear a mask outdoors when not required to, but around a group of people?
    a. Yes
    b. Most of the time
    c. Sometimes

   d. No

8. Do you use hand sanitizer and/or wash your hands frequently?
   a. Yes, very frequently
   b. Yes, frequently
   c. Sometimes
   d. No

A score of 0 was given to those who chose the answer that represented the least amount of contribution to limiting the spread of COVID-19. A score of three was given to those who chose the answer that represented the most contribution to limiting the spread of COVID-19. For example, for question 5, someone would receive a score of 3 if they selected "Yes, all the time," a 2 for choosing "Yes, most of the time," a 1 for answering "Sometimes," and a 0 for "No." The scores subjects received based on their answers to questions 4, 5, 6, and 7 were then added together to get a score out of 12 for their behavior. This variable will be referred to as *behavior* throughout the remainder of this analysis.

Questions 4, 9, 10, and 11 were asked to determine subjects' attitudes about the COVID-19 Pandemic. These questions are as follows:

4. If you have received the COVID-19 vaccination, would you have received it if no one required you to be vaccinated?
   a. Yes
   b. No
   c. Not Applicable. I have not received the COVID-19 vaccination.

9. Would you encourage someone you know to get vaccinated if they had not yet received their vaccination?
   a. No, I would not encourage them to get vaccinated.
   b. Only if I know the well enough would I encourage them to get vaccinated.
   c. Yes, I would encourage them to get vaccinated.

10. Suppose your friend is feeling symptoms of COVID-19 and has been tested but is waiting the results. What would you advice you friend to do?
   a. Isolate until test result is received.

   b. Try to isolate and wear a mask indoors when they are around others until test results are received.
   c. It is okay to continue with daily activities until test results are received.

11. If you have been in contact with someone who has tested positive for COVID-19, what would you do?
   a. I would not get tested and continue conducting my day normally, unless I started showing symptoms of COVID-19.
   b. I would get tested for COVID-19 and conduct my day normally until a positive test result was given.
   c. I would get tested for COVID-19 and isolate myself until a negative test result was received.

Similar to the methods used to determine *behavior*, a score of 0 was given when the answer represented the lowest contribution to decreasing the risk of contracting or spreading COVID-19. A score of 2 was given to the answers that represented the most contribution due to the fact that there were only three possible answers to questions 9, 10, and 11 instead of four. Question 4 had only two possible answers, yes and no; a subject would or would not have received the COVID-19 vaccine if they had not been required. This question was asked because students of the University of Vermont, the population this project sampled from, were required to become fully vaccinated and later receive booster shots for COVID-19 to attend unless they had circumstance which made them unable to receive it. Subjects received a score of zero if they answered no and two if they answered yes to question 4. The scores subjects received for their answers to questions 4, 9, 10, and 11 were added together to get a total score out of 8 for attitude. This variable will be referred to as *attitude* through the remainder of this paper.

Regression analysis was performed on the *behavior* and *attitude* variables to predict *contributions*. Before conducting a multiple regression analysis, variables are tested for multicollinearity because it is expected that *behavior* and *attitude* will be closely related to each other. If the VIF of *behavior* and attitude *variables* is too high (above 3.00), then simple regression models will be created for *attitude* and *behavior* to predict *contributions* from rounds

1, 11, 12, and average across all rounds. If the VIF of the behavior and attitude variable is low (below 3.00), a multiple regression analysis will be conducted, where *attitude* and *behavior* are used to predict *contributions* in rounds 1, 11, 12, and average contributions across rounds.

Round 1 is analyzed to determine the subjects' initial contribution before knowing what other players will also contribute. Round 12 and average contributions across all twelve rounds are analyzed to determine how the subjects learn throughout the game and how their contributions change over time. Round 11 was added to the analysis as a dependent variable after determining the pattern of contributions is not typical for round 12. In two of the three sessions conducted, round 12 was different from round 11.

Results

Results from Public Goods Game

The contributions made in all three sessions were compiled into one graph to determine each round's overall contributions, found in Figure 1. Average contributions in the first round were 5.23 tokens, and an average of 6.05 tokens were contributed in the final round. A two-tailed t-test determines that this was an insignificant increase (p-value = 0.433) in *contributions* from round one to round twelve. There was also an insignificant increase (p-value = 0.369) in *contributions* from the first to the eleventh round (average contributions in round eleven were 5.68).

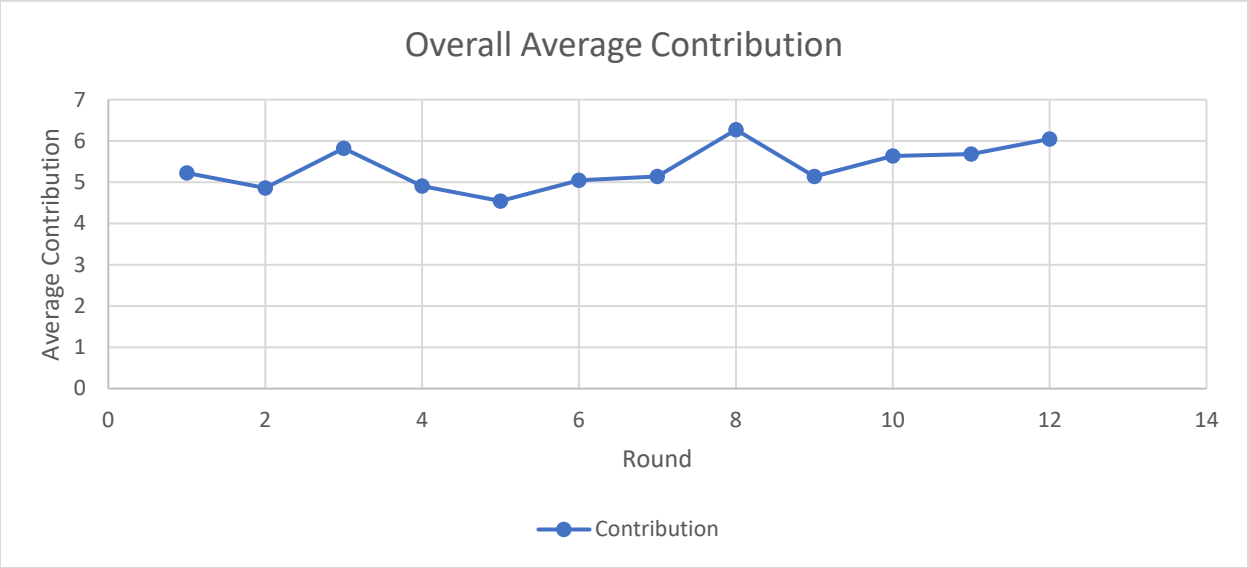


Figure 1: Overall Average Contributions

With the results from overall *contributions* from all three sessions in mind, further analysis must be done on each session to determine if there are outliers skewing the results which contradict those of the other studies that are similar in nature. Other studies, done by Urs Fischbacher and Simon Gachter (2010), and James Andreoni (1988) and more find that *contributions* decrease over time. In contrast, this study observes an insignificant increase in *contributions* from the first to the final round.

During the first session, the average contributions made by subjects start at 3.25 tokens. In general, *contributions* increase as the game went on, with a large spike in *contributions* (average contributions were 7.75) in the final round. A graph of the average contributions by players in the first session can be found in Figure 2. Conducting a two-tailed t-test on the first and last round, one can find that there is a significant increase (p-value = 0.045) in *contributions* from the first round to round twelve. There is no significant (p-value = 0.265) difference in *contributions* from the first round to round eleven.

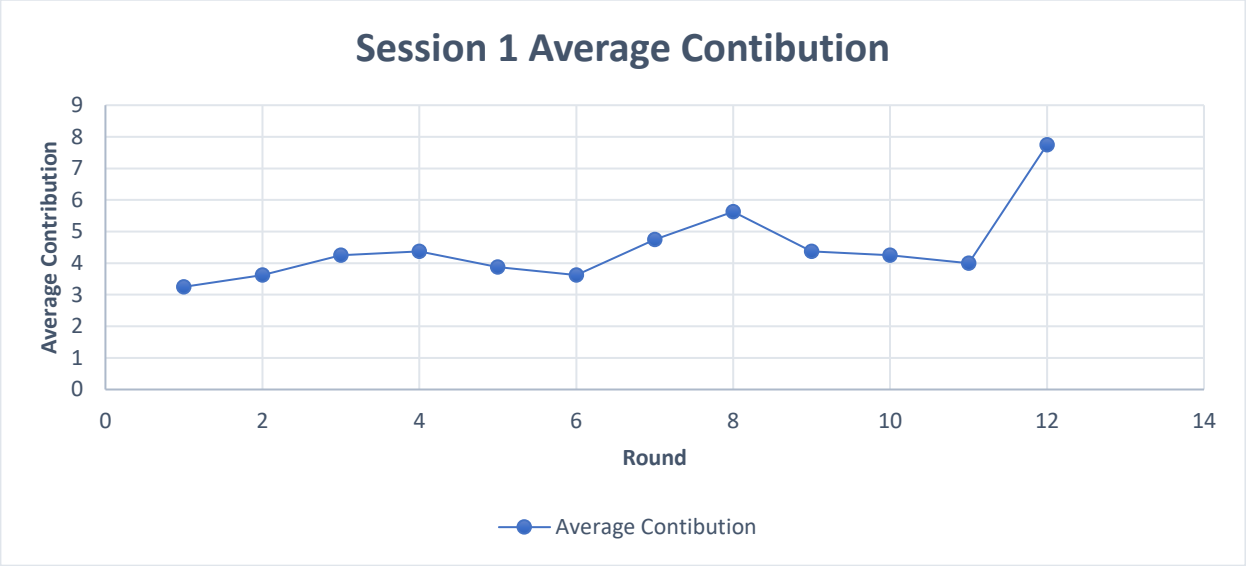


Figure 2: Session 1 Average Contributions

A graph of the average contributions in the second session can be found in Figure 3. In the second session there was a slight decrease in *contributions* from the first to the final round of the game; average contributions were 6.00 in the first round and 5.71 in the final round. However, this decrease is considered insignificant (p-value = 0.522). There is also no difference (p-value = 1) in *contributions* from the first round to round eleven (contributions were 6.00 in round eleven).

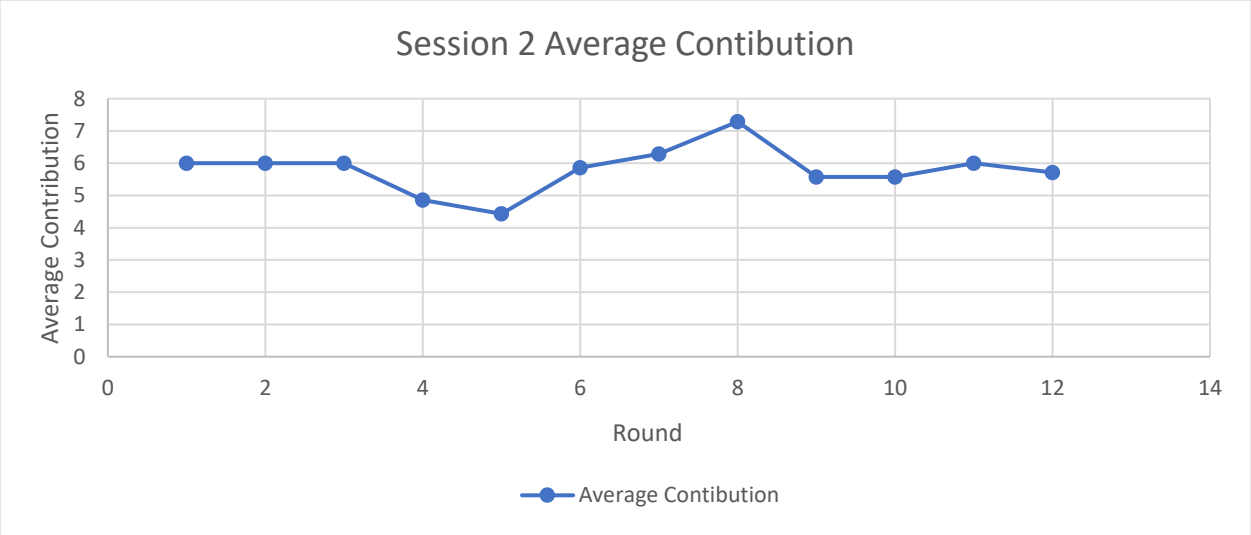


Figure 3: Session 2 Average Contributions

A graph of the average contributions in the third session can be found in Figure 4. In the third session, average contributions started at 6.71 tokens, and in the twelfth round, contributions were on average 4.43 tokens. This is not a significant decrease (p-value = 0.192) in *contributions*. In the eleventh round, there was an average of 7.29 tokens contributed. However, this is an insignificant increase (p-value = 0.700) in *contributions* from the first round when a two-tailed t-test is run.

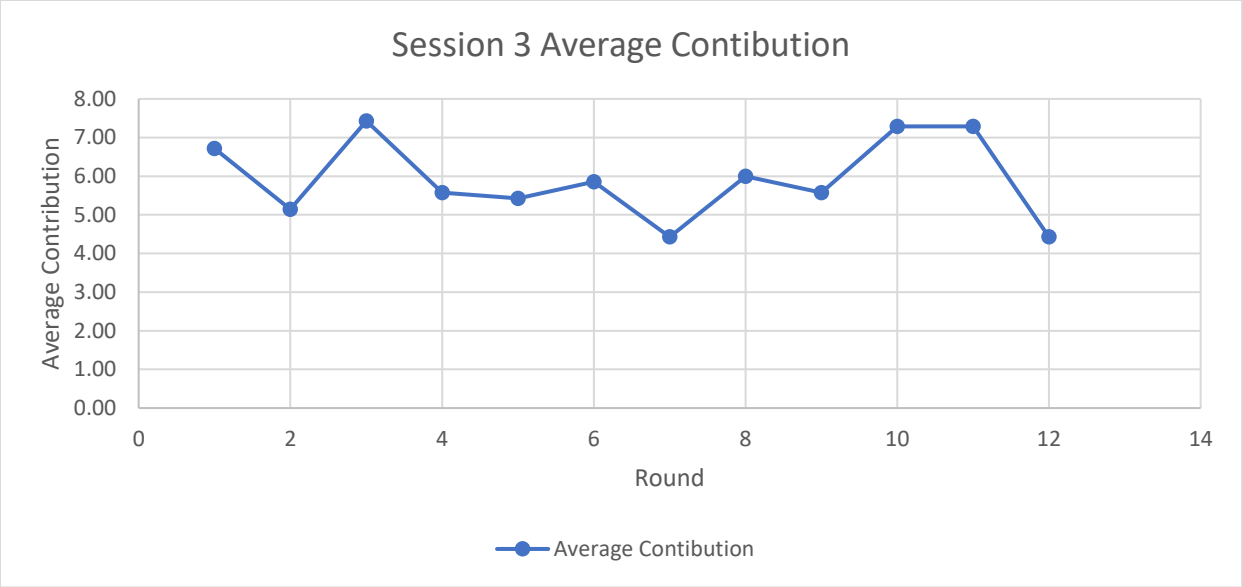


Figure 4: Session 3 Average Contributions

These results contradict those of other studies done that are similar in nature to the public goods game conducted in this project. *Contribution* does not significantly decrease in any of the sessions. Further investigation was done to see if there were a few participants who may have skewed the results. A graph of *contributions* each participant made in each round during the first session can be found in Figure 5. A graph of each player's *contributions* in each round in the second and third session can be found in Figures 6 and 7, respectively. A variety of types of contributors participated in this study. For example, ID5 is an unconditional contributor who contributes their entire endowment no matter what other players contribute. ID8 can also be identified as a free rider who contributed nothing no matter what other players contributed. ID19 can be identified as someone who continually changes their contribution.

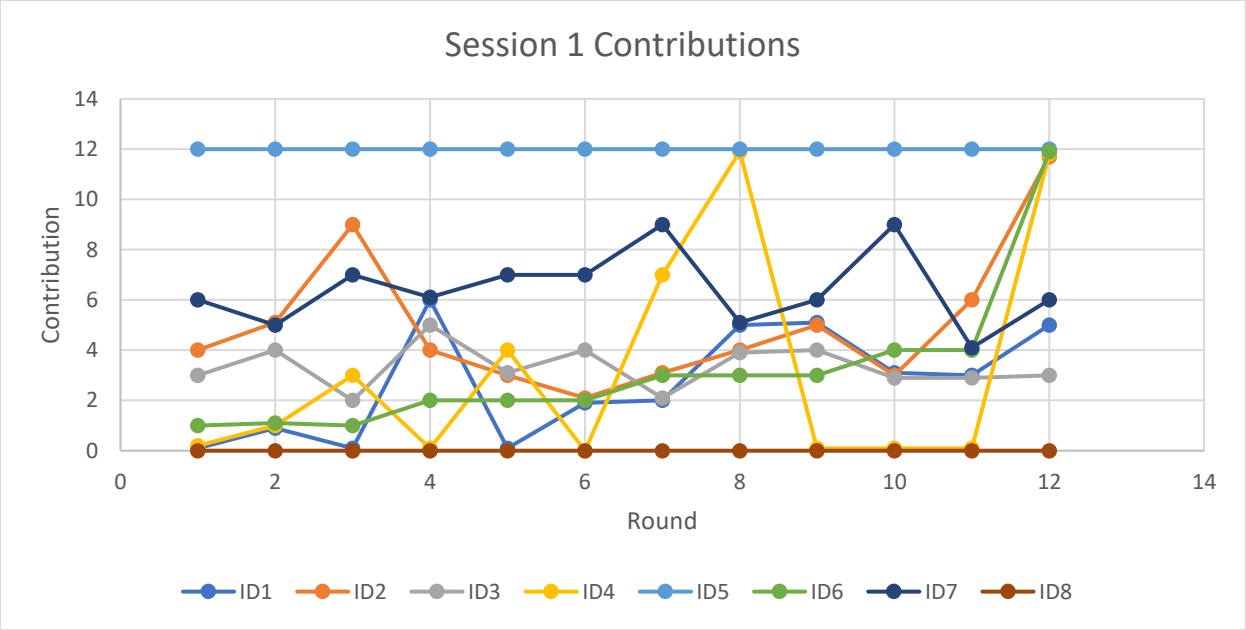


Figure 5: Session 1 Contributions

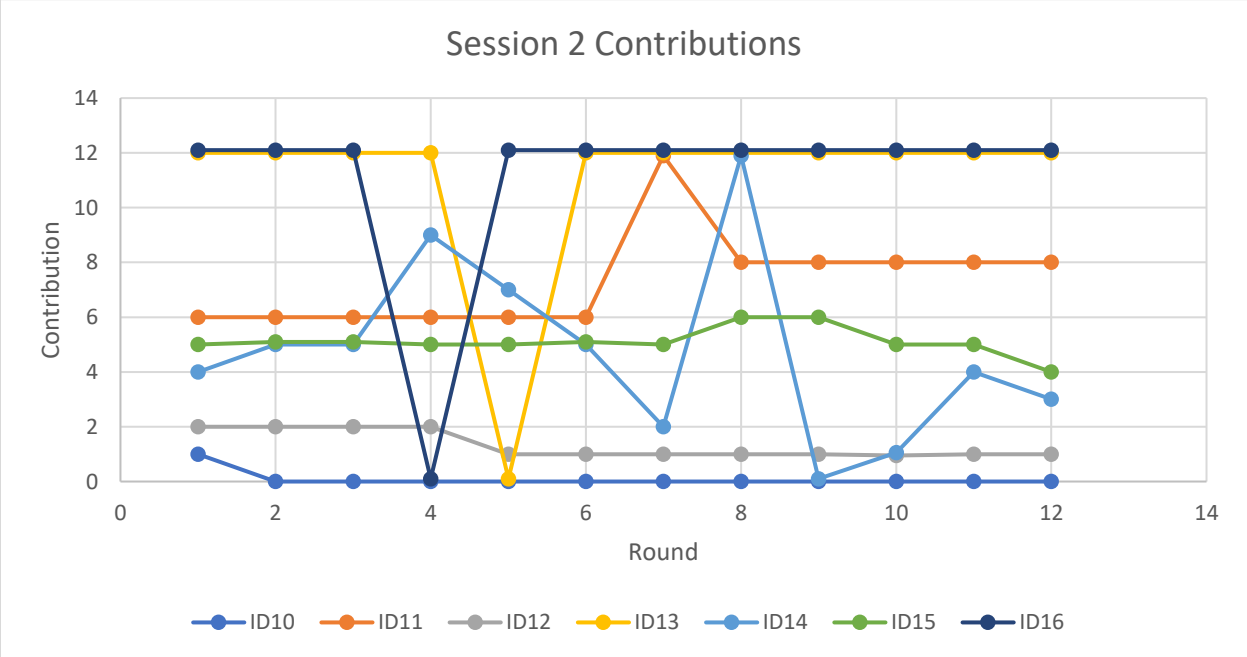


Figure 6: Session 2 Contributions

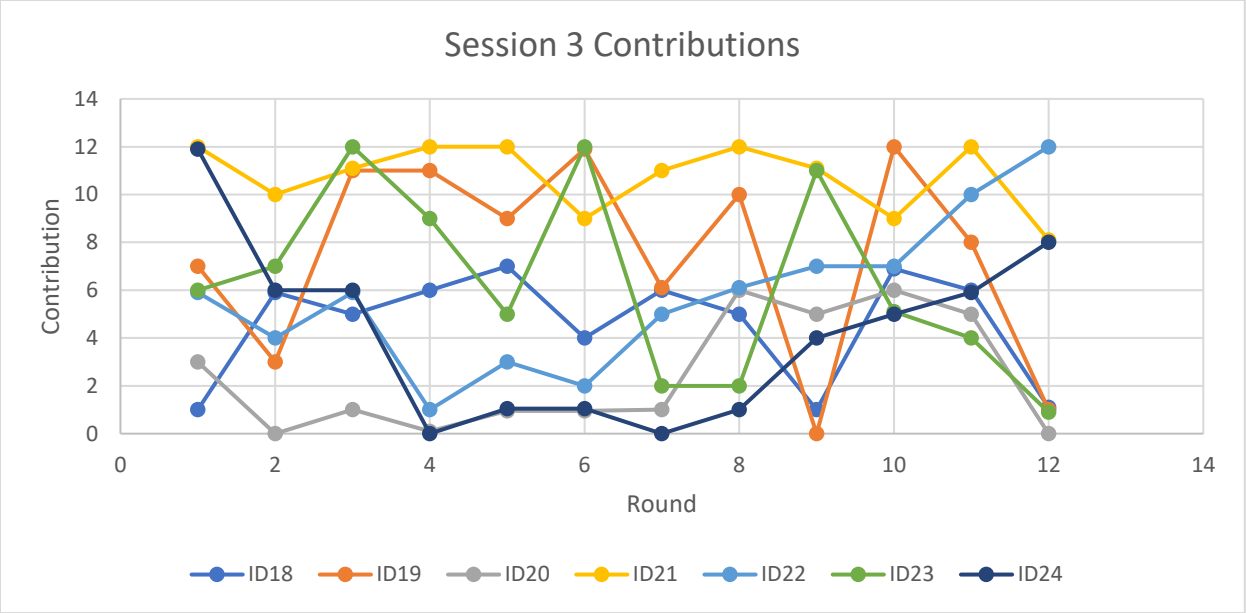


Figure 7: Session 3 Contributions

Using this information, one can determine what percentage of subjects increased, decreased, and maintained the same contributions from the first to the last two rounds. Using Table 1, one can see that 27.3% of contributions are greater in the twelfth round than their initial contributions in the first round, and 36.4% of contributions by players are greater in the eleventh round than their initial contributions. We can also see that only 40.9% of players contributed less in the twelfth round than in the first round, and 22.7% of players contributed less in the eleventh round than in the first round. Finally, 31.8% of players contributed the same amount in the first and last round, and 40.9% of players contributed equal amounts in the first and eleventh round of the public goods game. These results show that there were not just a few participants acting different than expected by either contributing the same amount or more than they had in the first round; there were quite a few.

Change in Participant Contributions from the First to The Eleventh and Twelfth Round		
	Round 11	**Round 12**
Contributions Less than Round 1	22.7%	40.9%
Contributions Equal to Round 1	40.9%	31.8%
Contributions Greater than Round 1	36.4%	27.3%

Table 1: Change in Participant Contributions from the First to The Eleventh and Twelfth Round

Results from COVID-19 Survey

Summary statistics were determined and are presented in Table 2 to begin the analysis of the COVID-19 survey data. The mean *attitude* for all 22 participants was 6.50, and the standard error was 1.37. *Attitude* represents what people believe they or the people they know should do in contributing to lower levels of COVID-19 circulation or not. Additionally, the minimum score received by a participant for the *attitude* variable was 2, and the maximum score received was 8 out of 8 possible points. For *behavior*, the mean score was 6.73, and the standard error was 2.41. The *behavior* variable described peoples' behaviors towards COVID-19 protocols, which include wearing a mask when one is required to or practicing good hand hygiene. Additionally, the minimum score received by a participant for the *behavior* variable was 3, while the maximum score received was 12 out of 12 possible points.

Summary of Behavior and Attitude				
	Mean	**Standard Error**	**Minimum**	**Maximum**
Attitude (0-8)	6.50	1.37	2	8
Behavior (0-12)	6.73	2.41	3	12

Table 2: Summary of Behavior and Attitude

A graph of the *behavior* and *attitude* variables was produced to investigate whether there is a positive and highly correlated relationship between the two variables. The graph of *behavior* and *attitudes* is shown in Figure 8. There is a positive correlation between *behavior* and *attitudes* of 0.56, which can be considered moderate. The two variables were then tested for multicollinearity to determine whether a simple or multiple regression was more appropriate. It is determined that the VIF is 1.46, which is low enough that a multiple regression analysis could be conducted.

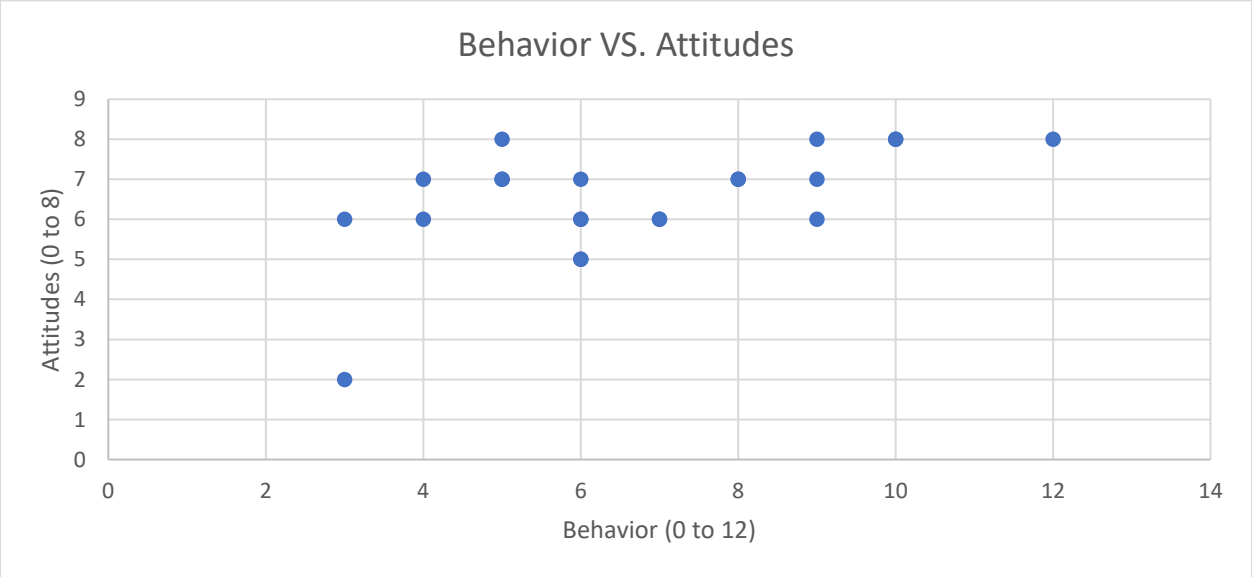


Figure 8: Behavior VS. Attitudes

Multiple regression analysis is conducted to determine the relationship between participants' *contributions* and their *attitude* and *behavior* towards COVID-19. This information can be found in Table 3a and 3b. There are three columns for the *contributions* in rounds 1, 11, 12, and average *contribution*. The columns labeled B contains the coefficients used to make predictions. The standard error is in the second column, and the third column shows the p-value or the level of significance.

Behavior, and *attitude* are significant predictors of *contributions* during rounds 1, 11, and average contributions. In round 12, however, *attitude* was not a significant predictor of *contributions* for the twelfth round (p-value = 0.114), while *behavior* was (p-value = 0.078). This could be due to it being the final round of the game. Participants are not incentivized to maintain a relationship with their group members as they did in other rounds when there would be subsequent rounds to reap the benefits of others' contributions to the public fund.

	Round 1 Contribution			**Average Contributions**		
	B	Standard Error	P-value	B	Standard Error	P-value
Intercept	2.16	4.21	0.614	4.79	3.00	0.127
Behavior	-0.99	0.43	0.035	-1.08	0.31	0.003
Attitude	1.49	0.77	0.065	1.21	0.55	0.040

Table 3a: Multiple Regression of Rounds 1, and average and Behaviors and Attitudes

	Round 11 Contribution			**Round 12 Contributions**		
	B	Standard Error	P-value	B	Standard Error	P-value
Intercept	4.26	3.83	0.279	2.80	4.90	0.571
Behavior	-0.99	0.40	0.021	-0.94	0.51	0.078
Attitude	1.25	0.70	0.089	1.47	0.89	0.114

Table 3b: Multiple Regression of Rounds 11, and 12 and Behaviors and Attitudes

Discussion

Results from this study indicate that there is a relationship between one's *contributions* during the public goods game, and their *attitudes* and *behavior* towards contributing to lowering the spread of COVID-19. However, some results contradict this study's hypothesis that those who contributed during the public goods game would also contribute outside the laboratory setting. There is evidence that *contributions* insignificantly increased instead of decreased as the game continued, which contradicts the findings of other studies which observe that contributions significantly decrease as the game continues. Additionally, there is a negative relationship between *behavior* and *contribution* from rounds 1, 11, 12, and average *contributions* across all twelve rounds, which is unexpected.

Using the regression equation, one can predict the dependent variable, *contributions*, using scores for participants' *attitudes* and *behaviors* towards contributing to lower levels of COVID-19 circulation. Some example predictions of *contributions* in rounds 1, 11, 12, and average contributions can be found in Table 4. Suppose someone was a free rider outside the public goods game and received a score of 0 for both *behavior* and *attitude*. In that case, it is expected that they would contribute about 2.16 tokens to the public fund in the first round, 4.26 tokens in the eleventh round, and 2.80 tokens in the twelfth round. On average, they would contribute about 4.79 tokens each round during the game. This model also predicts that someone who selected the answer that represented the most *contributions* to limiting the spread of COVID-19, receiving a score of 12 for *behavior* and 8 for *attitude*, would contribute 2.2 tokens in the first round, 2.38 tokens in the eleventh round, 3.28 tokens in the twelfth round, and 1.51 tokens on average. One final example of the predictions these multiple regression models make about the relationship between *attitude* and *behavior* and *contributions* is if they had scored for *behavior* and *attitude* similar to partial contributors. For example, if someone received a score of

six for attitudes and behavior. This regression model predicts that they would contribute 5.16 tokens in the first round, 5.82 tokens in the eleventh round, 5.98 tokens in the twelfth round, and 5.57 tokens on average.

Behavior	Attitude	Round 1 Contribution Prediction	Round 11 Contribution Prediction	Round 12 Contribution Prediction	Average Contribution
0	0	2.16	4.26	2.80	4.79
12	8	2.20	2.38	3.28	1.51
6	6	5.16	5.82	5.98	5.57

Table 4: Contribution Predictions

Although showing significant predicting abilities in most cases, this regression model is a bit puzzling due to the significant negative sign *behavior* has for all four measures of *contribution*. It would be expected that there would be a positive relationship between one's *behaviors* towards COVID-19 and their *contributions* during the game. If one contributes more to limiting the spread of COVID-19 by wearing a mask and practicing good hand hygiene, they would be considered contributors outside the laboratory. Therefore, those that contributed more to limiting the spread of COVID-19 would be expected to also contribute more during the public goods game. However, this negative relationship between *behavior* and *contribution* is contradictory to this hypothesis. This relationship could be due to the small sample size used in this research project. Having only 22 participants is a small sample size, and a lack of diversity in the population could cause an unexpected negative relationship. However, more research would need to be done to determine if this were the case.

Although results indicate a negative relationship between *behavior* and *contribution*, one's *attitude* and *contribution* are positively correlated. The positive relationship produced by the multiple regression model suggests that, on average, people who contribute more during the public goods game have more contributory attitudes about limiting the spread of COVID-19.

With all this in mind, the difference seen between the relationships *behavior* and *attitude* have with *contributions* could be because one has contributory attitudes but tends not to act on them, so their attitudes don't always match their behaviors. For example, one could agree that getting tested for COVID-19 and isolating themselves until they have received results after coming in contact with someone who had COVID-19 is a good idea, but in practice, they may tend not to do this. Knowing the sample taken is college students, maybe they were worried about missing class or falling behind, and negatively affecting their grades. They could have also been athletes who didn't want to let their team down by missing a game, so they convinced themselves they didn't need to get tested, or that something like that could never happen to them. There can be many reasons why someone's attitudes about the correct behavior and their actual behavior do not match.

Another reason for a negative relationship between *contribution* and *behavior* to be observed could be due to what was going on with COVID-19 at the time. Due to the timing of these experimental sessions, participants' perceived risk of COVID-19 circulation was lower at the time of the experimental session than it was during the Pandemic. This was also two years after the start of the Pandemic, so people could have been fed up with continually paying the cost of limiting the spread of COVID-19, and excited to get back to normalcy. Conducting this study during the Endemic could have affected peoples' answers to the survey to be less contributory for one's *behavior* than had the study been conducted during the Pandemic. Instead of observing

a negative relationship between *contribution* and *behavior*, a positive relationship may have resulted if the study were conducted during the Pandemic.

Conclusion

This experimental economics study examined the relationship between peoples' contributions in a public goods game and their contributions to public goods outside the laboratory, such as limiting the spread of COVID-19. The COVID-19 Pandemic, although destructive in many ways, created an interesting opportunity to study another public good. The COVID-19 Pandemic affected the world in similar ways. Everyone was expected to help reduce the risk of COVID-19 circulation by wearing face masks, social distancing, and eventually receiving a vaccination for the virus. Unlike relatively small-scale public goods, such as parks and beaches, where the costs of provision vary for different people, making it difficult to know if someone is not contributing because they are not interested or are freeriding, one's non-compliance with contributing to lower levels of COVID-19 circulation are more ably identified as freeriding instead of lack of interest.

It is expected that peoples' *contributions* in the public goods game have a positive and significant relationship with peoples' contributions outside the public goods game, contributing to lower levels of COVID-19 circulation. People who contribute more inside the laboratory are expected to contribute more outside the laboratory. The results support the hypothesis that there would be a relationship, but not the type of relationship that was expected. There was a significant and positive relationship between people's *attitudes* about limiting the spread of COVID-19 and their *contributions* during the public goods game, except for in the final round of the game, where there was an insignificant positive relationship. However, there was a

significant and negative relationship between subjects' *behavior* about limiting the spread of COVID-19 and *contributions* during the public goods game.

There are limitations to this study that should be noted. Having a small sample size restricts the level of significance of the results, which can explain why the results do not show a significant decrease in *contributions* from the first to the final session. Additionally, as noted above, all the subjects in the study were undergraduate students from the University of Vermont, so it is possible that these results may not apply to the general population. This study also did not utilize punishment or publicity in the public goods game like contributing or not to decreasing the risk of COVID-19 outside the laboratory. Peoples' contributions towards lower levels of COVID-19 circulation during the Pandemic was more public because it was easy to tell if someone was wearing a mask or not. Participants' *contributions* in the public goods game are not as public as their contribution to lower levels of COVID-19 circulation. Having a way to identify peoples' *contributions* during the game may simulate more similar situations to those outside the laboratory and more significant results. These limitations could explain why some of the results contradict those of other studies conducted that are similar in nature to the one completed here. Future studies should be done with a larger and more diverse population more representative of the general population.

Acknowledgments

I would like to thank Professor Sara Solnick for her advice and support throughout the entirety of this project. As my faculty supervisor, Professor Solnick, helped with the development of this typic, design, research, and writing process. Her advice throughout this project was an essential aspect of its success. I would also like to thank Professors Melissa Willard-Foster and Catalina Vizcarra for being on my Thesis Defense Committee. I would like to thank the University of Vermont for providing funding for this research project. Finally, I want to thank my friends and family who helped support this project and pushed me to be successful.

Works Cited

Anaki, David, and Jamie Sergay. “Predicting health behavior in response to the coronavirus disease (COVID-19): Worldwide survey results from early March 2020.” *Plos one* 16.1 (2021): e0244534

Anderson, S. P., Goeree, J. K., & Holt, C. A. (1998). A theoretical analysis of altruism and decision error in public goods games. *Journal of Public Economics*, *70*(2), 297-323.

Andreoni, J. (1988). Why free ride?: Strategies and learning in public goods experiments. *Journal of Public Economics*, *37*(3), 291-304.

Andreoni, J., & Petrie, R. (2004). Public goods experiments without confidentiality: a glimpse into fund-raising. *Journal of Public Economics*, *88*(7-8), 1605-1623.

Benz, M., & Meier, S. (2008). Do people behave in experiments as in the field?—evidence from donations. *Experimental economics*, *11*(3), 268-281.

Burlando, R. M., & Guala, F. (2005). Heterogeneous agents in public goods experiments. *Experimental Economics*, *8*(1), 35-54.

Buso, I. M., De Caprariis, S., Di Cagno, D., Ferrari, L., Larocca, V., Marazzi, F., ... & Spadoni, L. (2020). The effects of COVID-19 lockdown on fairness and cooperation: Evidence from a lablike experiment. *Economics Letters*, *196*, 109577.

Burton-Chellew, M., & D'Amico, V. (2021). Humans prefer to copy success rather than the social norm in a cooperative game.

Chaudhuri, A. (2011). Sustaining cooperation in laboratory public goods experiments: a selective survey of the literature. *Experimental economics*, *14*(1), 47-83.

Englmaier, F., & Gebhardt, G. (2011). Free-Riding in the Lab and in the Field. *Available at SSRN 1941907*.

Fehr, E., & Fischbacher, U. (2002). Why social preferences matter–the impact of non-selfish motives on competition, cooperation, and incentives. *The economic journal*, *112*(478), C1-C33.

Fischbacher, U., & Gächter, S. (2006). Heterogeneous social preferences and the dynamics of free riding in public goods.

Fischbacher, U., & Gachter, S. (2010). Social preferences, beliefs, and the dynamics of free riding in public goods experiments. *American economic review*, *100*(1), 541-56.

Fleming, P., & Zizzo, D. J. (2011). Social desirability, approval, and public good contribution. *Personality and Individual Differences*, *51*(3), 258-262.

Ledyard, John O. "Public Goods: A Survey of Experimental Research." (1995): 111-194.

Marwell, G., & Ames, R. (1980). Experiments on the Provision of Public Goods. II. Provision Points, Stakes, Experience, and the Free-Rider Problem. *American Journal of Sociology*, *85*(4), 926-937. Retrieved April 20, 2021, from http://www.jstor.org/stable/2778712

Reindl, I., Hoffmann, R., & Kittel, B. (2019). Let the others do the job: Comparing public good contribution behavior in the lab and in the field. *Journal of Behavioral and Experimental Economics*, *81*, 73-83.

Stoddard, Madison, et al. "Individually optimal choices can be collectively disastrous in COVID-19 disease control." *BMC public health* 21.1 (2021): 1-12.

Thoma, Volker, et al. "Cognitive predictors of precautionary behavior during the COVID-19 Pandemic." *Frontiers in Psychology* 12 (2021): 325.

van Baal, S., Walasek, L., & Hohwy, J. (2021). Staying home so you can keep going out: A multiplayer self-isolation game modelling pandemic behavior.

Volk, S., Thöni, C., & Ruigrok, W. (2011). Personality, personal values, and cooperation preferences in public goods games: A longitudinal study. *Personality and Individual Differences*, *50*(6), 810-815.

Appendices

Appendix A: Research Information Sheet

Research Information Sheet

Title of Research Project:
The Relationship Between Adherence to COVID-19 Regulations and The Public Goods Game

Principal Investigator:
Taylor Clark

Faculty Sponsor:
Professor Sara Solnick

Funding:
FOUR Mini-Grant

Introduction:
You have been invited to participate in this research study because you are age 18 or older at the University of Vermont. This study is being conducted by Taylor Clark at the University of Vermont.

Purpose
The purpose of this study is to examine the connection between subjects' behavior and cooperation within a laboratory and outside the laboratory.

Study Procedures
You will be asked to complete a survey and play an online interactive game with another group of participants. Eight participants in this session will complete the interactive game as a group.

The survey will ask you questions about your actions and opinions of COVID-19 protocols during the COVID-19 Pandemic.

After completing the survey, you will be given further instructions for completing the online interactive game. After the instructions have been read, there will be an opportunity to ask any questions you have.

Study participation will take place in a lab at the University of Vermont and will take a total of approximately one hour.

Benefits
Although, as a participant in this study, you may not directly benefit from this study, it is hoped that the information gained from the study will help me complete my honors thesis project and

learn more about the relationship between behavior inside a controlled experiment and outside the laboratory, in the real world.

Risks
Your participation in this study does not involve any physical or emotional risk to you beyond that of everyday life.

Please note that although our research will take precautions to ensure your confidentiality, there is always a chance that your confidentiality could get breached.

Please tell the researcher, Taylor Clark, if you believe that you have been injured due to taking part in this study. You can tell the researcher by calling or texting (802)-272-0400 with any questions or concerns you have.

Costs
There are no costs to you, the participant, associated with participating in this study.

Compensation
You will receive $6 for completing the session, and receive additional compensation based on you and your group members decisions during the interactive activity.

Confidentiality
To protect your confidentiality, we will not use your name or any other personal information that would identify you when reporting on the data collected during the research study to protect your confidentiality.

If the results of this study are published or presented, individual names and other personally identifiable information will not be used.

I ask that everyone in the group not repeat what they have heard others say, but there is always a chance someone will repeat what you have said. Everything you say will be kept confidential by the researchers.

Please note that none of the answers you provide in the survey will be used to take any actions against you. It is strictly a questionnaire used to collect data for the analysis in this research study. It will not be used for anything other than this research study.

You will be required to provide your name and address each time you receive a payment.

Voluntary Participation/Withdrawal
Taking part in this study is voluntary. You are free to not answer any questions or withdraw at any time. You may choose not to take part in this study, or if you decide to take part, you can change your mind later and withdraw from the study. If you leave the research study before it is finished, the data collected before you leave will not be included in the project analysis.

Questions

You may contact Taylor Clark, the Investigator in charge of this study, at (802)-272-0400 for more information about this study. If you have any questions about your rights as a participant in a research project or for more information on how to proceed should you believe that you have been harmed as a result of your participation in this study, you should contact the Director of the Research Protections Office at the University of Vermont at 802-656-5040.

Appendix B: COVID-19 Survey

COVID-19 Survey

Please answer the following questions as honestly as you can. No actions will be taken for any responses you provide. The responses you provide will be kept confidential.

Please raise your hand if you have any questions and Taylor will come to your station to answer your question.

*Required

12. ID Number (Number on card Provided) *

    _____

13. Have you received the COVID-19 vaccination? *
    a. Yes, I am fully vaccinated.
    b. No, but I am currently in the process of becoming fully vaccinated.
    c. No, I have not been vaccinated at all, but I plan to receive my vaccination in the future.
    d. No, I have not been vaccinated and do not plan to receive my vaccination in the future.

14. Have you received your COVID-19 booster shot? *
    a. This is not applicable. I have not received my COVID-19 vaccination.
    b. I have not received my COVID-19 booster shot and no not plan to receive it.
    c. I have not received my COVID-19 booster shot, but plant to receive it in the near future.
    d. I have received my COVID-19 booster shot.

15. If you have received the COVID-19 vaccination, would you have received it if no one required you to be vaccinated? *
    a. Yes
    b. No
    c. Not Applicable. I have not received the COVID-19 vaccination.

16. Do you wear a mask when you are required to? *
    a. Yes, all the time.
    b. Yes, most of the time.
    c. Sometimes.
    d. No

17. Do you wear a mask indoors when you are not required to? *
    a. Yes

b. Most of the time
c. Sometimes
d. No

18. Do you wear a mask outdoors when not required to, but around a group of people? *
    a. Yes
    b. Most of the time
    c. Sometimes
    d. No

19. Do you use hand sanitizer and/or wash your hands frequently? *
    a. Yes, very frequently
    b. Yes, frequently
    c. Sometimes
    d. No

20. Would you encourage someone you know to get vaccinated if they had not yet received their vaccination? *
    a. No, I would not encourage them to get vaccinated.
    b. Only if I know the well enough would I encourage them to get vaccinated.
    c. Yes, I would encourage them to get vaccinated.

21. Suppose your friend is feeling symptoms of COVID-19 and has been tested but is waiting the results. What would you advice you friend to do? *
    a. Isolate until test result is received.
    b. Try to isolate and wear a mask indoors when they are around others until test results are received.
    c. It is okay to continue with daily activities until test results are received.

22. If you have been in contact with someone who has tested positive for COVID-19, what would you do? *
    a. I would not get tested and continue conducting my day normally, unless I started showing symptoms of COVID-19.
    b. I would get tested for COVID-19 and conduct my day normally until a positive test result was given.
    c. I would get tested for COVID-19 and isolate myself until a negative test result was received.

Appendix C: Online Interactive Game Instructions

Online Interactive Game Instructions

Now that you have completed the survey, you will complete an online interactive game.

Game Format:
You will complete 12 rounds with the same 8 people. Each round, you will receive 12 tokens, at which point you will decide how many tokens to contribute to a public fund and how many to keep in your personal fund. All the tokens contributed to the public fund by your entire group will be multiplied by 2 and distributed equally to all the group members. You can contribute between 0 and 12 tokens to the public fund.

During the game, you will not be able to see anyone's name or the decisions they make, and no one will be able to see your name or the decisions you make. Each player will only be able to see the total amount of tokens contributed to the public fund by the group.

Tokens:
Each token is worth $1. You will receive 12 tokens at the start of each round. You cannot transfer tokens to another round when deciding how much to contribute to the public fund.

Payment:
You will receive a cash payment at the conclusion of the study, based on one round of the online interactive game. After all rounds of the interactive game have been completed, a die will be rolled to determine which round you will be compensated for. The tokens you had at the end of the chosen round will be converted to the amount you will be paid. For every token you have at the end of the chosen round, you will receive $1. The amount you earn will be paid in cash before you leave and after you have signed a receipt for the amount.

Example:

Player	Tokens at the beginning of the Round	Tokens Contributed to the Public Fund	Tokens in the Personal Fund (Column 2 - Column 3)	Tokens received from the Public Fund (50*2/8 = 12.5)	Total Tokens at the end of the Round
1	12	12	0	12.5	12.5
2	12	4	8	12.5	20.5
3	12	7	5	12.5	17.5
4	12	10	2	12.5	14.5
5	12	3	9	12.5	21.5
6	12	8	4	12.5	16.5
7	12	0	12	12.5	24.5
8	12	6	6	12.5	18.5
		Total Tokens Contributed = 50			

Total tokens contributed to the public fund are multiplied by two and then divided equally between all eight players. So, 50 tokens that were contributed to the public fund by various players are multiplied by 2 (50 * 2) to get 100 tokens in the public fund to be distributed equally to all 8 players (100 / 8), which means that each of the 8 players will receive 12.5 tokens from the public fund.

Please note the only details provided to you during the game are the total tokens contributed to the public fund and the total tokens in your procession at the end of the round.

Quiz Question:
Please take a few minutes to complete the following table using the information presented above. All tokens contributed to the public fund are multiplied by two before being divided equally between all players.

Player	Tokens at the beginning of the Round	Tokens Contributed to the Public Fund	Tokens in the Personal Fund	Tokens received from the Public Fund	Total Tokens at the End of the Round
1	12	12			
2	12	9	3		
3	12	10	2		
4	12	7	5		
5	12	6			
6	12	5	7		
7	12	11	1		
8	12	4			
		Total Tokens Contributed = 64			

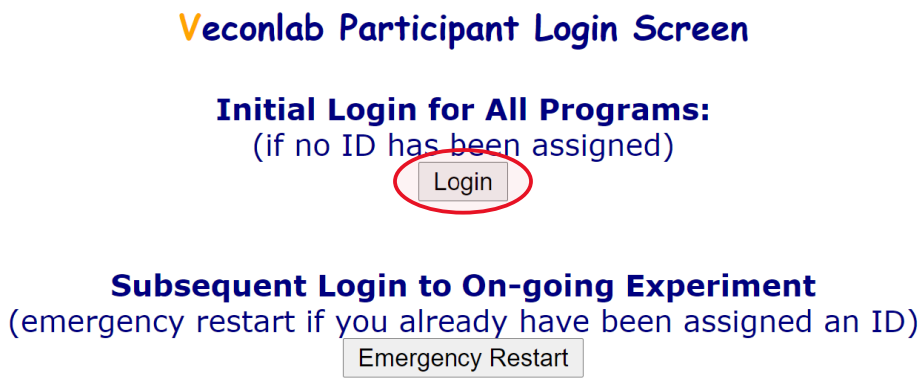
Appendix D: Online Platform Setup

Online Platform Setup

This online interactive game will be played on a website called veconlab. You will register as a participant using the information on the notecard provided to you upon your arrival at the session.

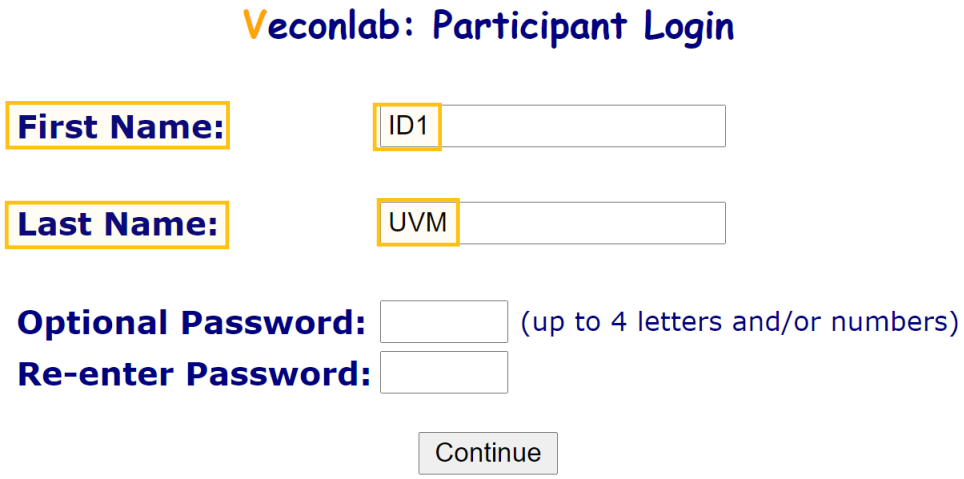
Begin by typing veconlab into the search bar and clicking the first link that appears. You will then click the second option, "Login as Participant."

Then click login in the next screen (Seen below):



Entering the Session:
Then you will enter the Session ID provided on your notecard in the space where your session name is asked for.

Creating an Account:
Next, you will be asked to create an account. **Please enter the ID number provided to you on your ID card in the space for your first name and UVM in the space for your last name.** For example, if the ID Number provided on someone's notecard were ID1, they would enter the following:

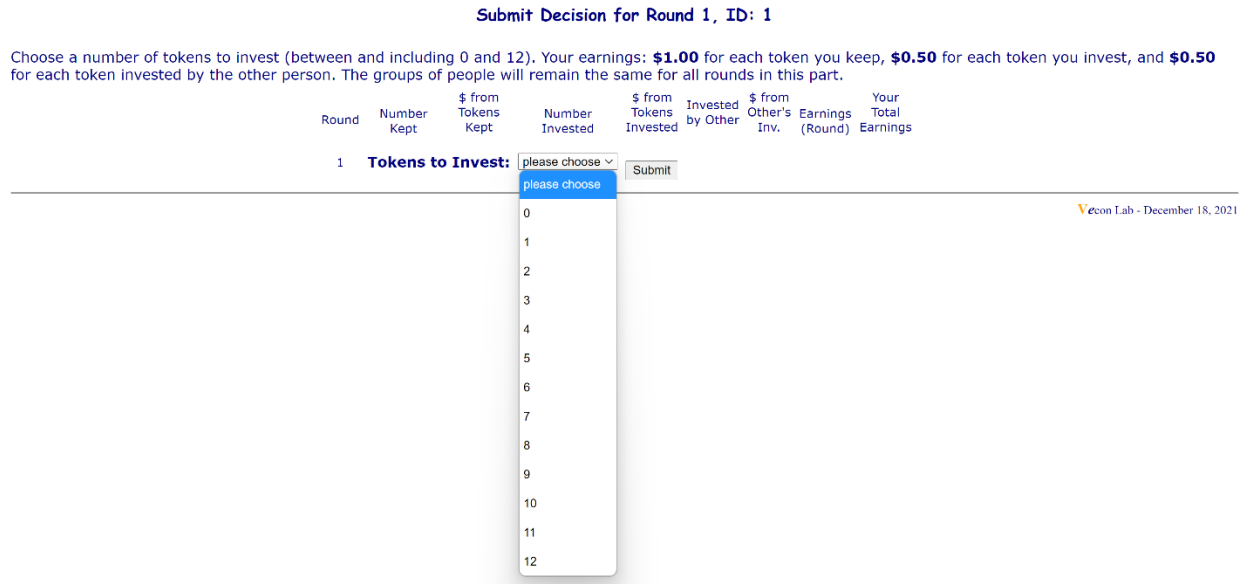


If you would like, you can create an optional password before proceeding to the instructions provided by veconlab in case you get logged out and need to rejoin the session.

You will be ready to begin the interactive game once you have:

- Entered the session
- Created an account
- Read the instructions veconlab provides
- Answered the questions veconlab asks about the game
- Asked any questions you have

Once you have started the game on veconlab, you will encounter a drop-down menu that will allow you to choose how many tokens you would like to keep for your personal fund and how many you would like to contribute to the public fund.



Once you have decided how many tokens you would like to contribute to the public fund and keep in your personal fund, you can click submit, at which point you will be asked to confirm your decision or change your decision, as seen in the image below.

Confirm Decision for Round 1, ID: 1

You have indicated that you wish to invest **9** and keep **3**.

If this is not what you intended, please press **Change Decision** below.
Otherwise, press **Confirm** to obtain the results.

To rechoose: Change Decision To continue: Confirm Decision

You will need to wait to know your earnings for each round until everyone has made their decision and confirmed it.

During the game, please refrain from communicating with your group members or anyone other than myself if you have any questions once the interactive game begins.