ECON 4803
Second Project Proposal
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Scope Insensitivity & Charitable Giving

Purpose & Context

We are interested in exploring how scope insensitivity affects decision-making about charitable giving based on contingent valuation. Scope insensitivity is a common cognitive bias that occurs when people make judgments that are insensitive to the number - or scope - of the things they are evaluating. Previous studies have found that people commonly fall prey to scope insensitivity and are inconsistent in their estimations of large quantities of objects. Our study will explore scope insensitivity generally, as well as the effect of a framing treatment on people's ability to overcome scope insensitivity. Scope insensitivity has many implications, but we are particularly interested in exploring its effects on people's decisions about charitable giving. If framing does reduce scope insensitivity, charities may be able to use similar techniques to increase donations.

Basic Methodology

We will use a short online survey to assess scope insensitivity. It will consist of three parts:
(1) Activity: Our experimental group will complete a mathematical activity consisting of questions designed to reduce scope insensitivity by training people to perform simple numeric scaling exercises. Survey participants will choose a numeric response from a list of multiple choice questions and will be able to move ahead in the study regardless of if they answer correctly or not since subjects are not required to be good at math to take the survey. Our control group will complete an unrelated language activity designed to engage their minds for a similar amount of time as the experimental group will be. Like the experimental group, control group participants will be able to move ahead regardless of answer correctness.
(2) Contingent Valuation Questions: This consists of three groups of three open-ended questions (9 total) that evaluate people's willingness to pay to save the lives of nonhuman animals and humans. Each group will have three identical questions that vary only in the size/scope of the group in question. Each question will be classified as small (S), medium (M), or large (L). The small, medium, and large amounts will increase incrementally by 10x, 5x, and 20x for question groups 1, 2, and 3 respectively. Group 1 asks about birds, group 2 asks about turtles and Group 3 asks about children. Respondents will be able to answer any numeric value up to 999,999,999. Both the control and experimental group will complete these questions.

(3) Demographic Questions: These six demographic questions will allow us to control for demographic factors and know how representative our respondents are of the general population. We are particularly interested in asking for respondents' household income and expenses to control for the effect of income on valuation. Both the control and experimental groups will complete these questions.

The treatment in our study is completing the mathematical activity. We will compare the responses of the experimental and control groups to the valuation questions to see if our math framing activity affected people's ability to make consistent judgments about the value of animal and human life. This is a between-subjects design because we are comparing control-group participants to experimental-group participants. We hypothesize that our mathematical activity framing questions will reduce scope insensitivity and make people's responses to the valuation questions more rational and consistent.

To help reduce the effects of order bias, we will use six different versions of the valuation questions that arrange the choices for all three question groups in six specified orders. The SML version of our contingent valuation survey questions can be found in Appendix D as an example with the link to the actual survey located in Appendix F. Our study is in part a replication of previous studies and could easily be replicated in the future.

Sampling

We will distribute our survey using several different mechanisms, including email, group chats, flyers, and social media. Our participants will likely be primarily Georgia Tech students, which makes our sample less representative of the general population and limits our study's generalizability to other contexts. We would like to have a minimum of 60 participants to allow for at least 30 each in the control and experimental groups. Participants will randomly be placed into either the experimental group or the control group and will randomly receive one of the six orders of the valuation questions.

Measurements

Our dependent variable (or response variable) is the willingness-to-pay (WTP) reported by survey participants. More specifically, we want to track the differences in participants' WTP responses in each question group (scaling) and run a statistical analysis to determine how close the average WTP scaling in both the treatment and control aligns with an arbitrarily chosen mathematical standard of consistency. In other words, we are interested in how participants change their per-life valuations within each question group. For example, a participant may pay $100 to save 20 dogs (a $5 per life valuation) but only $200 to save 100 dogs (a $2 per life valuation). We will calculate per-life valuations for each participant and each question using simple formulas described in the "Analysis & Results" section below.

Our primary independent variable is the inclusion of a mathematical activity that those assigned to the treatment group will participate in. To be more specific, we want to see if the inclusion of simple mathematical calculations as a precursor to providing gut-reaction WTP responses will significantly change the average per-life valuations in the treatment group when compared to the control group such that they are more consistent and rational. While the specific responses from the mathematical activities are not the focus of our analysis, including who answered the math questions correctly and who didn't may prove significant in the multivariable regression model. Nevertheless, we are primarily interested in the numeric values provided by each participant in response to the contingent valuation questions and if the act of completing the mathematical activity as a whole is significant.

To compute our descriptive statistics, we will calculate average per-life valuations for each question and for the entire sample of participants, the control group, and the experimental group. To test for reliability, we will use ANOVA to test for significant variations between demographic groups. We will do the same to test for significant variations arising as a result of differences in the question order. Finally, we will remove any statistical outliers that could alter our results.

Analysis & Results

Upon the completion of the surveys, we will use a one-way ANOVA (analysis of variance) test to measure variance in valuation consistency between our treatment and control groups. Our data will be tested under a 95% confidence level and p-value of 0.05 to determine statistical significance. The ANOVA test will determine if there are statistically significant differences between the S, M, and L scope categories of both the treatment and control. According to our hypothesis, there may be statistically significant differences between scope categories of the control; however, the mathematical intervention may be enough to produce consistent per-life values across increasing scopes. In this case, the ANOVA test will tell us that there are no statistically significant differences between the three scope levels.

To present our results, we will use a simple table such as the example seen below. Every participant will submit their willingness-to-pay (WTP) during the contingent valuation portion of the survey. We will then calculate the per-life value using this formula: WTP/(the number of lives affected). Lastly, we will determine the consistency of the per-life values by looking at the percentage change between each category. For example, if somebody's per-life value for question 1(S) is $5 and their per-life value for question 1(M) is $2.50, they failed to properly scale their WTP to maintain a consistent per-life value. In this way, we can get an average scaling between the S, M, and L categories. The numbers in the table below are speculative and meant to serve as a visual example of the per-life values we could receive and the percent change as the scope scales up.

Table 1: Speculative per-life valuations ($) and the percent change compared to the smallest scope (S)

Group/Scope	S	M	L
1 (birds)	$5	$2.50 (-50%)	$1 (-80%)
2 (turtles)	$10	$8 (-20%)	$3 (-70%)
3 (children)	$8	$2 (-75%)	$1 (-87.5%)

Once we have collected all of the data, calculated all of the per-life values, and determined the percent change between categories, we can run a one-way ANOVA test for the treatment group as well as for the control group as described earlier in this section.

One downside to the one-way ANOVA test is that it will tell us if there are any significant differences between the S, M, and L categories, but it will not tell us which of the categories are different from the rest. For example, when scaling from S to M, the per-life values could be consistent, but then drastically change when scaling from M to L. As a result, additional testing may be required to determine if there are significant differences within categories. In this case, additional ANOVA testing or using multiple t-tests between categories could be viable options.

To better understand the differences between the data we collect, we will use a multi-variable, ordinary least squares regression model to control for the demographic information of our participants, namely age, gender, ethnicity and education, to see if there are any significant effects on our participants' average willingness to pay per life (WTPPerLife). Additional variables that will be controlled for include annual household income, participant monthly expenses on essentials, and participant monthly expenses on nonessentials. The format for our multi-variable linear regression model can be seen below:

$$y = \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots \beta_n x_n$$

where, y = participant average willingness to pay per life

x_n = the nth independent variable

β_n = the nth coefficient

Including an ordinary least squares regression model similar to the one above will allow us to better quantify the relationship each potentially relevant variable could have with the participants' WTPPerLife responses. For example, if we want to better understand the effect reported income has on WTPPerLife, we can include it as an input variable in the above equation. In this case, holding all else equal, the beta-coefficient for the income variable will tell us what the expected average

willingness-to-pay per life increase or decrease per respective unit increase or decrease in income would be for the participants. By testing whether the beta-coefficient is statistically significant or not, we can better understand the relevance of the variable to participants' WTPPerLife. A detailed breakdown of the model can be found in Appendix G.

The usage of statistical analysis software such as STATA will be required to effectively run this analysis. Upon the completion of the analysis, we hope to have interesting results to discuss in our conclusion and presentation.

Ethical Considerations

There are no major ethical concerns for participants and we do not expect them to be subjected to anything above minimal risk. We will deceive participants slightly about the purpose of the study, but do not expect this to have any consequences or risks for participants. We have included language ensuring participants that their decisions made within the survey have no bearing on the real world in order to minimize the risk of emotional turmoil. We will include a consent agreement that participants must complete. It is included in Appendix A.

Appendices

We have attached several appendices containing the materials we plan to use in our study and a bibliography.

(1) Appendix A: Consent Form
(2) Appendix B: Mathematical Activity
(3) Appendix C: Linguistic Activity
(4) Appendix D: Contingent Valuation Questions
(5) Appendix E: Demographic Questions
(6) Appendix F: Qualtrics Survey
(7) Appendix G: OLS Regression Model Details
(8) Appendix H: Bibliography

Appendix A: Consent Form

Thank you for considering participation in our study! We are completing this study as a class project for ECON 4803, taught by Dr. Whitney Buser at Georgia Tech's School of Economics. We are interested in studying patterns related to charitable giving. To participate, you will complete a short survey. We expect that it will take no more than 30 minutes. We will not collect any personally identifying information, and you will remain anonymous. We do not anticipate that you will incur any risks from participating. At any time, you can choose to close the survey and not continue. If you wish to learn more about our research, feel free to contact us using the information provided here.

By continuing, you agree to the following:
I am between the ages of 18 and 65.
I have read and understand the provided information.
I understand that I have the opportunity to ask questions at any point.
I understand that my participation is voluntary and that I can withdraw my participation at any time and for any reason.
I voluntarily agree to participate in this study.

Appendix B: Mathematical Activity

1. A rice cooker has a capacity of 12 cups of fully-cooked rice. Uncooked rice triples in volume when cooked. How much uncooked rice can be put into the rice cooker without making it overflow when cooked?
    a. 3 cups
    b. 4 cups
    c. 9 cups
    d. 14 cups
2. An ant can lift about 50 times its body weight. If humans had the same capability, how much weight would a 200 pound person be able to lift?
    a. 250 pounds
    b. 1,250 pounds
    c. 10,000 pounds
    d. 150,000 pounds
3. An essay is written on an 11 inch tall sheet of paper. There are 1 inch margins on the top and bottom of the page. If each line of text takes up ½ th of an inch, how many lines of text can fit on the page?
    a. 18 lines
    b. 72 lines
    c. 924 lines
    d. 6724 lines
4. The rate at which air is blown through a tuba determines the volume of the sound emitted from it. This relationship can be represented using the equation Volume (in decibels) = 12 X Rate. If the rate is 4, what is the volume?
    a. 0.8 decibels
    b. 48 decibels
    c. 100 decibels
    d. 4000 decibels

Appendix C: Linguistic Activity

1. Select the number of commas missing from this sentence: Sarah Jolene, and Mary set out on a walk and they encountered a large statue.
    a. 1
    b. 2
    c. 3
    d. 4
2. Name the error in this sentence: This activity, known as "doing a donut," is when a driver drifts a car in a circular, often leaving skid marks on the asphalt.
    a. Mixed construction
    b. Parallelism
    c. Naked "this"
    d. Inverted structure
3. Select the word that should be capitalized in this sentence: The oak flooring was installed on a tuesday during the spring of 2017.
    a. Oak
    b. Tuesday
    c. Spring
    d. Installed
4. Name the term that applies to the word "bicycle" in this sentence: The proud owner of the new bicycle beamed at his creation.
    a. Verb
    b. Objective complement
    c. Article
    d. **Object of the preposition**

Appendix D: Contingent Valuation Questions

Please answer the following questions accurately to the best of your ability. The questions asked are purely hypothetical and will not have any effect in the real world.

1. "At least 102 species of birds are known to have been harmed by the BP oil spill [in 2010], including black skimmers, brown pelicans, clapper rails, common loons, laughing gulls, northern gannets and several species of tern" (krüg). Consider a hypothetical scenario in which birds are dying due to oil spills, but your donation would guarantee the lives of many birds.
    a. How much would you be willing to pay to save the lives of around 2,000 birds with certainty?
    b. How much would you be willing to pay to save the lives of around 20,000 birds with certainty?
    c. How much would you be willing to pay to save the lives of around 200,000 birds with certainty?
2. "Plastic waste is everywhere, on the surface of the ocean, underwater and on the beach. It is estimated that more than 1,000 turtles die every year after getting entangled in plastic, and this number is almost certainly a gross underestimate" (Lipponen). Now, consider a hypothetical scenario in which an earth clean-up campaign launched globally could effectively remove all plastic waste from the ocean.
    a. How much would you be willing to donate to this campaign if you knew with certainty that your donation would save the lives of around 40 sea turtles?
    b. How much would you be willing to donate to this campaign if you knew with certainty that your donation would save the lives of around 200 sea turtles?
    c. How much would you be willing to donate to this campaign if you knew with certainty that your donation would save the lives of around 1,000 sea turtles?
3. "The global prevalence, morbidity and mortality related to childhood asthma among children has increased significantly over the last 40 years" (Serebrisky). Consider a hypothetical scenario in which increasing the cost of healthcare would definitely reduce the number of childhood deaths related to asthma per year.
    a. How much would you be willing to pay for this healthcare to reduce the number of childhood deaths by 1 next year?
    b. How much would you be willing to pay for this healthcare to reduce the number of childhood deaths by 20 next year?
    c. How much would you be willing to pay for this healthcare to reduce the number of childhood deaths by 400 next year?

Appendix E: Demographic Questions

(1) What is your age in years?

(2) Which of the following best describe your gender identity?
   (a) Female
   (b) Male
   (c) Transgender female
   (d) Transgender male
   (e) Nonbinary
   (f) Other. Please specify: _____
   (g) Prefer not to say

(3) Which of the following describe your ethnic or racial identity? You can select as many answers as are appropriate.
   (a) Hispanic or Latnix
   (b) White
   (c) Black or African American
   (d) Native American or Alaska Native
   (e) Asian or Pacific Islander
   (f) Other. Please specify: _____
   (g) Prefer not to say

(4) Which of the following best describes your level of education?
   (a) Incomplete High School
   (b) High School Diploma
   (c) Undergraduate 1st Year
   (d) Undergraduate 2nd Year
   (e) Undergraduate 3rd Year
   (f) Undergraduate 4th year
   (g) Undergraduate 5+ Years
   (h) Graduate
   (i) Other. Please Specify: _____

(5) What is your annual household income? Here, we are defining household income as the pre-tax, cash income of family members or other individuals sharing most living expenses. If you are a student but your parents or other family members pay for over half of your living expenses, please include their income in your household income. Use your best estimate.

(6) On average, how much do you spend on essential expenses per month? Here, we are defining essential expenses as anything necessary to maintain your basic well-being. This includes rent

or a mortgage payment, utilities, transportation costs, insurance, groceries, tuition, required textbooks, and any medical expenses. Use your best estimate.

(7) On average, how much do you spend on non-essential expenses per month? Non-essential expenses include anything you purchased primarily for enjoyment. Some examples might be restaurant meals, entertainment expenses, or any non-essential travel, material goods, and clothing. Use your best estimate.

(8) Have you ever donated to a charity in the past? The amount does not matter.
    (a) Yes
    (b) No

(9) Do you have plans to donate to at least one charity at some point in your future?
    (a) Yes
    (b) No

Appendix F: Qualtrics Survey

Survey Link: https://gatech.co1.qualtrics.com/jfe/form/SV_9slKoaaSAb8oTci

Edit Link: https://gatech.co1.qualtrics.com/survey-builder/SV_9slKoaaSAb8oTci/edit

Appendix G: OLS Regression Model Details

The dependent variable of interest is:

- WTPPerLife - A quantitative measurement of respondents' average willingness to pay per life as calculated by averaging participants' WTP/(the number of lives affected) for all of the questions responded to by the participants in the contingent valuation section of the survey

In detail, the variables to be controlled include:

- treatment - A binary variable with 1 representing having taken the math activity and 0 representing having taken the grammar activity
- version - A categorical variable from 0 to 5 representing the different question formats with 0 representing SML, 1 representing SLM, 2 representing MSL, 3 representing MLS, 4 representing LSM, and 5 representing LMS. This variable will be broken down into the following for the model:
    - SML - (This variable will be left out for collinearity reasons) A binary variable with 1 representing the participant took the SML format contingent valuation and 0 representing did not
    - SLM - A binary variable with 1 representing the participant took the SLM format contingent valuation and 0 representing did not
    - MSL - A binary variable with 1 representing the participant took the MSL format contingent valuation and 0 representing did not
    - MLS - A binary variable with 1 representing the participant took the MLS format contingent valuation and 0 representing did not
    - LSM - A binary variable with 1 representing the participant took the LSM format contingent valuation and 0 representing did not
    - LMS - A binary variable with 1 representing the participant took the LMS format contingent valuation and 0 representing did not
- score - A quantitative variable 0 to 4 representing the number of the respective activity questions that the participant answered correctly
- yearlyHouse - A quantitative variable recording the annual household income in US Dollars of participants
- monthlyEss - A quantitative variable recording the monthly essential expenditure in US Dollars of participants
- monthlyNonEss - A quantitative variable recording the monthly nonessential expenditure in US Dollars of participants
- age - A quantitative variable recording the age of the participants in years

- gender - A categorical variable with 0 representing other, 1 representing female, 2 representing male, 3 representing transgender female, and 4 representing transgender male. This variable will be broken down into the following for the model:
    - otherGen - (This variable will be left out for collinearity reasons) A binary variable with 1 representing having selected other and 0 representing not
    - female - A binary variable with 1 representing female and 0 representing not
    - male - A binary variable with 1 representing male and 0 representing not
    - tFemale - A binary variable with 1 representing a transgender female and 0 representing not
    - tMale - A binary variable with 1 representing a transgender male and 0 representing not
- ethnicity - A categorical variable with 0 representing Other, 1 representing Hispanic or Latnix, 2 representing White, 3 representing Black or African American, 4 representing Native American or Alaska Native, and 5 representing Asian or Pacific Islander. This variable will be broken down into the following for the model:
    - otherEth - (This variable will be left out for collinearity reasons) A binary variable with 1 representing having selected other and 0 representing not
    - hisLat - A binary variable with 1 representing Hispanic or Latnix and 0 representing not
    - white - A binary variable with 1 representing white and 0 representing not
    - blaAfrAme - A binary variable with 1 representing black or African American and 0 representing not
    - natAmeAla - A binary variable with 1 representing Native American or Alaska Native and 0 representing not
    - asiPacIsl - A binary variable with 1 representing Asian or Pacific Islander and 0 representing not
- charityPast - A binary variable with 1 representing the participant has donated to a charity in the past and 0 representing not
- charityFuture - A binary variable with 1 representing the participant plans on donating to a charity in the future and 0 representing not

Appendix H: Bibliography

Works Cited

Krüg, Kris. "A Deadly Toll." *Center for Biological Diversity*, https://www.biologicaldiversity.org/programs/public_lands/energy/dirty_energy_development/oil_and_gas/gulf_oil_spill/a_deadly_toll.html. Accessed 23 September 2022.

Lipponen, Matilda. "How can I help save Sea Turtles from Plastic Pollution?" *Projects Abroad*, 12 July 2022, https://www.projects-abroad.org/blog/how-we-can-help-save-sea-turtles/. Accessed 23 September 2022.

Serebrisky, Denise. "Pediatric Asthma: A Global Epidemic - PMC." *NCBI*, 22 January 2019, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7052318/. Accessed 23 September 2022.

Chang, Hannah H, and Pham, Michel Tuan. "Affective Boundaries of Scope Insensitivity." *Journal of Consumer Research,* Volume 45, Issue 2, August 2018, Pages 403–428, https://doi.org/10.1093/jcr/ucy007 Published 05 March 2018.

"Scope insensitivity: failing to appreciate the number of those who need our help." *Effective Altruism Forum.* https://forum.effectivealtruism.org/s/B79ro5zkhndbBKRRX/p/NmDrpKdmjr. Published 22 August 2022.