No moral wiggles in e5 and e1,000 dictator games under ambiguity

Brañas-Garza, Pablo and Kovářík, Jaromír and Lopez-Martin, Maria del Carmen

Dpto. Fundamentos del Analisis Economico I, University of the Basque Country UPV-EHU,, LoyolaBehLab Departament of Economics, Universidad Loyola,, LoyolaBehLab Departament of Economics, Universidad Loyola,

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No moral wiggles in €5 and €1,000 dictator games under ambiguity*

Pablo Brañas-Garza†, Jaromír Kovářík‡§, María C. López†

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Abstract

This paper explores excuse-driven behavior in giving. In our powered laboratory experiment, participants play Dictator Games sharing 5€ or 1,000€ under certainty or ambiguity with a charity. In contrast to previous papers using MPLs –that necessarily introduce additional layers of uncertainty–our subjects participate in two DGs. We find no evidence that people use moral wiggles to hide their selfishness. They share equally out of 5€ under certainty and ambiguity and as much

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†*LoyolaBehLab* & Departament of Economics, Universidad Loyola, Escritor Castilla Aguayo, 414004 Córdoba, Spain.

‡Dpto. Fundamentos del Análisis Económico I, University of the Basque Country UPV-EHU, Av. Lehendakari Aguirre 83, 48015 Bilbao, Spain.

§CERGE-EI, a joint workplace of Charles University in Prague and the Economics Institute of the Czech Academy of Sciences, Politických vězňu 7, 111 21 Prague, Czech Republic.

out of 1,000€ under ambiguity as they do under certainty in the previous literature. These findings raise the question whether previous results might be an artifact.

Keywords: Giving, charity, uncertainty, ambiguity, stakes.
JEL codes: D64, D81, C91.

1 Introduction

Generous behavior in the Dictator Game (DG, hereafter) is well documented. Subjects donate an average of 30% of the pie and few keep the entire pie for themselves; if the recipient is a charity, the donations are even higher and many donate the whole pie (see Engel (2011) for a meta-study).

Although these numbers support the idea of "pro-social" human behavior, the vast majority of research has been conducted under certainty.[1] Nevertheless, donors to charities are rarely fully aware of how their money will be used and to what extent their goals will be achieved, parents while sharing with/saving for their offspring cannot predict how their "gifts" will affect their children's life, physicians exert costly effort on their patients even though the result of their work depend on a myriad of aspects out of their control, or the money inverted in the prevention of climate change for future generations has largely unpredictable consequences. All these acts of altruism toward others involve considerable degree of ambiguity and the stakes at play are large. Since these examples represent important aspects of human life and the humanity as a whole, we need to understand how the combination of ambiguity and large stakes shapes human generosity.

[1]For the sake of clarity, we follow the following terminology. *Certainty* refers to situations, in which subjects know the size of the pie, the amount of money they receive, and the amount received by the recipients. Under *uncertainty*, at least one aspect of the situation is not known with certainty. The term *risk* is employed for cases, in which the probabilities of different events are known, and *ambiguity* for cases when the probabilities are unknown. See e.g. Ellsberg (1961); Kovářík (2015); Trautmann and Van De Kuilen (2015).

Uncertainty should affect the behavior of a standard expected-utility maximizer in a particular way, but people may use uncertainty–be at risk or ambiguity–strategically to share less without affecting their social image, a phenomenon termed "moral wiggle room" (Dana et al., 2007). Haisley and Weber (2010), Brock et al. (2013) and Cettolin et al. (2017) indeed support this idea in situations, in which the donated quantity is risky. Exley (2015) reports evidence that this is due to "motivated reasoning" that helps to justify behaving less generously. The effects of uncertainty are weaker when the risk is either on the Dictators' or on both sides though (Brock et al., 2013; Cettolin et al., 2017). As for ambiguity, Haisley and Weber (2010) find that subjects are less generous under ambiguity compared to risk, arguing that ambiguity reinforces the excuses to give less. Nevertheless, Cettolin et al. (2017) and Garcia et al. (2018) find no differences in giving under ambiguity versus risk.[2] This evidence notwithstanding, there is one key aspect of these studies: they typically elicit the behavior using multiple price lists, paying subjects for one randomly chosen decision within each list and paying for one or two randomly chosen lists.[3] However, such a payment scheme necessarily introduces additional layers of uncertainty into the decision problem,[4] confounding the impact of uncertainty generated by the design and by the payment scheme.[5] We claim that, independently of the forces introduced by such incentive structures and their effects on subjects' behavior, they prevent a clean measure of the introduction of uncertainty into the decision of how

[2]Kellner et al. (2019) test how people share their prize from a lottery before and after they learn whether they win.

[3]Haisley and Weber (2010) is an exception.

[4]In fact, this converts the standard DG, used as a benchmark in e.g. Brock et al. (2013) or Exley (2015), into a choice under uncertainty.

[5]This payment methodology–at least–introduces additional risk and complexity into the decision problem that may affect subjects decisions directly through their uncertainty attitudes or indirectly through their cognitive limitations and/or biases. For example, there exist large evidence that humans face difficulties computing probabilities, an effect reinforced in compound lotteries (Wakker, 2010; Abdellaoui et al., 2015), many people are averse to compound risk (Halevy, 2007; Abdellaoui et al., 2015) or to complexity (Kovářík et al., 2016; Amador et al., 2019).

much to donate.[6]

As for stakes, the evidence ranges from strong negative effects of stakes on giving (Leibbrandt et al., 2015) through mild effects (List and Cherry, 2008; Novakova and Flegr, 2013; Raihani et al., 2013) to positive effects in Andersen et al. (2018). However, all these studies have been conducted under certainty. To the best of our knowledge, there exists no evidence regarding the effect of stakes on excuse-driven behavior in the presence of moral wiggle room.

This paper reports two main studies testing to what extent stakes affect giving to charity under ambiguity. Study I analyzes whether subjects use ambiguity as an excuse to donate less out of 5€ when both the amount held for themselves and the part donated to the charity are subject to the same degree of ambiguity, compared to certain 5€. Study II was designed to test the effect of stakes: it compares how people distribute ambiguous 5€ vs. 1000€ between themselves and a charity. Study III replicates both Study I and II.

Our analysis enrich the existing evidence in several ways. First, our sample was predefined by statistical power. The sample is large enough to detect an average effect of 0.4SD, with a power of 0.8 and a significance level of 90%. Second, in contrast to studies employing multiple price lists that introduce an additional layer of uncertainty, subjects in Studies I and II decide twice, minimizing learning and moral cleansing across decisions (Brañas-Garza et al., 2013), and both decisions are paid. Moreover, our main results only use the first decision of each subject. Third, to test the robustness of our results, we directly reproduce our findings in an independent study (Study III, hereafter) with a different subject pool. Fourth and most importantly, we the first to investigate whether stakes matter for generosity in the presence of the moral

[6] We do not advocate against multiple price lists generally. As any other elicitation protocol, they have their advantages and drawbacks. The point we raise is that they introduce additional uncertainty into experiments studying the effect of the *introduction* of uncertainty.

wiggle room.

Our data reject the hypothesis that people hide their non-selfish motives behind uncertainty, independently of the amount distributed. In fact, subjects give 11.46% more under ambiguity than under certainty if they distribute 5€ ($t - test = 2.04$, $p = 0.043$). As for stakes, participants donate 32.55% less while distributing ambiguous 1000€ compared to an equivalent situation in which 5€ are distributed ($t = -7.112$; $p < 0.0001$). Nevertheless, such a decline is in line with the effect of stakes in the DG under certainty documented in the literature. Since Study III corroborates the findings with a different sample, we conclude that people do not exploit the moral wiggle room provided by the ambiguity. Since the studies that include both risk and ambiguity never find larger giving under risk than ambiguity, we believe that these conclusions would extend to the comparison of certainty and risk.

The rest of the paper is organized as follows. Section 2 outlines the general design features. Sections 3 - 5 present the details of each study. The last section concludes.

2 Experimental Procedures

A total of 620 students of the University Loyola Andalucia in Spain (ULA, henceforth), enrolled in a number of courses across different fields of study and the two campuses of ULA, participated in our experiments. Each student was only allowed to participate in one of the sessions. We conducted multiple sessions and each session lasted approximately an hour. The experimenters recruited the subject for an experimental study, in which they could earn money. Students who agreed to participated were seated in a classroom and provided the instructions explaining the anonymity rules, the procedures, and compensation in the experiment. Instructions were given in written form and questions were solved in private. Since all sessions were conducted in classrooms, the data was elicited using paper and pencil. Ethics

Committee of the Universidad Loyola Andalucía approved the experiment and all participants signed an informed consent.

During the instruction process, the participants first signed a written consent and they were informed that they would receive 5€ only for their participation (i.e., with certainty). They were then informed that, during the experiment, they would have a chance to earn more money. In particular, they were informed that their choices could earn them another 5€ and they would independently participate in a lottery for another 1000€. However, no subject was informed about any other detail regarding what would be the content of the experiment, which choices they would make, what would determine whether they earn these quantities etc. That is, they were entirely agnostic regarding the next phase of the experiment, including the odds of earning the money. In the terminology of this paper, the probabilities of earning the extra 5€ and 1000€ were *ambiguous* for the participants.

Once instructed, all subjects were invited to fill up a questionnaire eliciting individual heterogeneity (socio-demographics, risk and social attitudes, etc.). Most importantly, the questionnaire contained two (Studies I and II) or three (Study III) DGs against a charity of their choice.[7]

As for the three DGs implemented, they differed in two dimensions, the stake and the (un)certainty of the amount distributed, as follows:

- **DG5.** In this game, each participant can donate any part of the 5€ she receives for participation to a charity of her choice. Since subjects knew at the moment of the decisions that they receive these 5€ with certainty, DG5 is a standard five-euro DG under certainty.

- **DG5A.** In this case, each participants can donate any part of the 5€ she can earn during the experiment and the donation would be implemented if they won the 5€. Given the information people possessed

[7]More precisely, the instructions listed five charities particularly popular in Spain as well as an option "Other" that allowed subjects to name any other charity of their choice. Many actually did.

regarding the possibility to earn the 5€ while choosing, DG5A is a five-euro DG under ambiguity.

- **DG1000A.** Since DG1000A only differs from DG5A in the stake distributed, it is a one-thousand-euro DG under ambiguity.

Our subjects participated in two main studies (labeled as Study I and Study II, respectively) and one replication experiment (Study III). In Study I, people make choices in both DG5 and DG5A; in Study II, people participated in DG5A and DG1000A. In both studies, roughly 50% of subjects answered one DG first and the other one second whereas the other 50% faced the games in the reverse order. In our replication Study III, the subjects faced the three DGs and we again control for potential ordered effects. This considerations notwithstanding, our main results are based on the very first decision only. See below for more details regarding each study.

Independently of whether a subject participated in two or three DGs, all the decisions were implemented and they were implemented independently. That is, in contrast to the multiple price lists where choosing one decision for implementation decreases the probability of choosing any other one, the implementation was independent in our experiment. Therefore, every single decision has real monetary consequences.

Only once all participants have handed in their choices in the DGs, we distributed the instructions and sheets for the second part of the experiment that aimed at eliciting social networks in their classes. Whether a subject has actually earned 5€, 1000€, or both was determined by her answers and the answers of other members of her class, but this was not known to the subjects while providing answers to the DGs analyzed in this paper.

The following sections describe each of our three studies separately.

3 Study I: Ambiguity versus certainty

Similarly to the previous literature (see Haisley and Weber, 2010; Cettolin et al., 2017; Garcia et al., 2018), Study I tests the hypothesis that people use ambiguity as an excuse to behave selfishly employing stakes common in the experimental literature. This section is organized in two subsections, one describing particular design features of this study and one presenting the results.

3.1 Sample, design and power

Sample: For an average effect of 0.33SD, with a power of 0.8 and a significance level of 90%, we needed a sample size of $n = 200$ for a single treatment (baseline + treatment); see Appendix A.1 for details. Hence, Study I comprises 204 university students (56.93% females).

Experimental tasks: Each subject faced two DGs (DG5 and DG5A) against a charity of their choice both of them involving real money but differing in whether the money was certain or not. In both games, the Dictators were invited to share any fraction of the 5€ from the set (0%, 10%, 20%, . . . , 100% of the pie). Subjects had no information whatsoever about the probability of earning the 5€ in DG5A. They were only informed that there would be a chance to earn the money in a subsequent task.

Order effects and random assignment: Since each subject faced both games, we label the two choices using a subscript $t = 0, 1$ and implement both orders. Subjects were randomly assigned to a treatment (order) with $p = 1/2$:

T0: The sequence DG5_0 first and then DG5A_1 ($n = 104$).

T1: The sequence DG5A_0 first and then DG5_1 ($n = 100$).

3.2 Results

The main text mostly focuses on the first decision of every participant (that is, $DG5_0$ and $DG5A_0$ in Study I) using between-subject comparisons. The second decisions are mentioned only briefly in the main text and mostly relegated to the Appendix.

Figure 1 shows the distributions of donations in $DG5_0$ and $DG5A_0$. Both distributions are very similar to the distributions reported in the literature in the DG against a charity, including the modal choice of donating the whole pie (see Figure 4 in Engel, 2011).

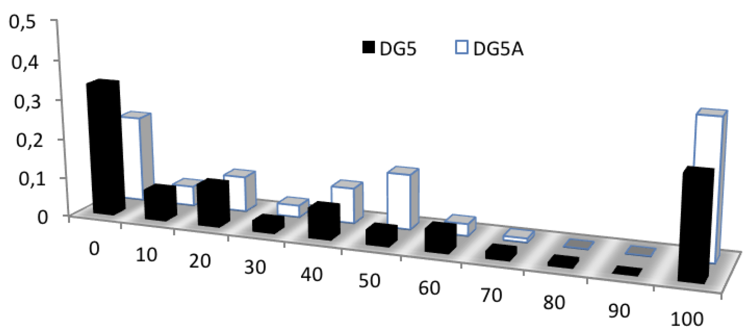

Figure 1: Donations in DG5 and DG5A

Concerning the efffect of ambiguity, the figure suggests that people give somewhat more in $DG5A_0$ than $DG5_0$. There is a larger fraction of subjects keeping the entire endowment for themselves and fewer people giving amounts around 50% and 100% of the pie in the latter case. On average, subjects donate 50.792% of the pie in $DG5A_0$ while the fraction drops to 39.32% in $DG5_0$. This difference of 11.46% is significant at 5% ($t - test = 2.04$, $p = 0.043$).

The donations decrease in t_1, independently of the order (see Appendix).[8]

[8] Although we are aware of no study that would repeat giving to charity, people commonly decrease their giving in the DG over repetitions (Engel, 2011), an effect that seems to be stronger for men (Espinosa and Kovářík, 2015).

People give an average of 37.70% in $DG5_1$ and 36.35% in $DG5A_1$; the difference is not statistical significant ($t - test = -0.240$; $p = 0.808$). Although we are aware that the comparison in t_1 is hard to interpret because of the differing subjects' histories in the two treatments, the numbers confirm that ambiguity does not seem to be exploited to hide one's selfishness.[9] As a result, we conclude:

Result 1: *Subjects do not use ambiguity as an excuse to give less under 5€.*

4 Study II: Effect of stakes under ambiguity

Under certainty, the literature reports a timid impact of stakes on giving with some differences across studies (see e.g. List and Cherry, 2008; Novakova and Flegr, 2013; Raihani et al., 2013; Leibbrandt et al., 2015; Andersen et al., 2018).[10] To the best of our knowledge, we present the first analysis of the effect of stakes on giving under ambiguity.

4.1 Sample, design and power

Sample: For an average effect of 0.33SD, with a power of 0.8 and a significance level of 90%, we need a sample size of $n = 200$ for a single treatment (baseline + treatment). Study 2 comprises 202 participants (54.46% females).

Experimental tasks: Each subject faced two DGs (DG5A and DG1000A) against a charity of her choice both of them involving real money but differing in the size of the pie. In both cases, subjects were invited to sare any fraction of the pie from the set (0%, 10%, 20%, ..., 100% of the pie) without having any information whatsoever about the probability of earning the pie to be

[9] Appendix A2 reports the within-subject analysis of the transition from t_0 to t_1 leading to the same conclusion (see Result A1).

[10] In contrast, Slonim and Roth (1998) report that rejections in the Ultimatum Game vanish with learning under high stakes.

distributed but knowing that if they do the pies would be 5€ in DG5A and 1,000€ in DG1000A.

Order effects and random assignment: Subjects were randomly assigned to one of the two treatments (game orders) with $p = 1/2$:

T0: The sequence $\mathrm{DG5}_0$ first and then $\mathrm{DG1000A}_1$ ($n = 106$).

T1: The sequence $\mathrm{DG1000A}_0$ first and then $\mathrm{DG5A}_1$ ($n = 96$).

4.2 Results

Figure 2 plots the distributions of the amounts donated to charity in $DG5A_0$ and $DG1000A_0$. We observe that, in relative terms, the subjects are far more generous in $DG5A_0$ donating an average of 51.22% of the pie, compared to 18.67% in $DG1000A_0$.[11] In sharp contrast to $DG5A_0$, almost no participant gives away the whole pie in $DG1000A_0$ and the majority of donations is concentrated around low fractions ($\leq 20\%$). In quantitative terms, subjects decrease their donation by 32.55% if stakes are high ($t = -7.112$; $p < 0.0001$).

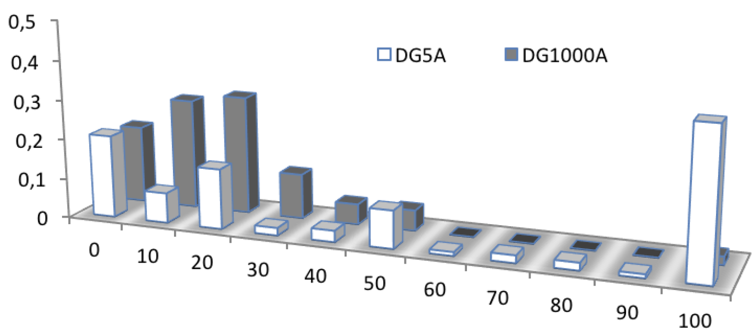

Figure 2: Donations in $DG5A_0$ and $DG1000A_0$

[11] We note that giving in $DG5A_0$ is identical in Studies I and II ($t = -0.076; p = 0.939$). The average donations are 50.79% and 51.22%, respectively.

Subjects again decrease their donations in $t = 1$, but the ranking is preserved. The average donation in $DG5A_1$ is 24.86% while people give an average of 16.53% in $DG1000A_0$. Although the difference is significant at 3% ($t = 2.190; p = 0.030$), remember that people have different experiences and the $t = 1$ result thus has to be interpreted with caution. Appendix A3 extends this analysis.

Result 2: *Under ambiguity, people donate less if they distribute 1,000€ compared to 5€.*

4.3 Certainty vs. ambiguity with high stakes

Although Result 2 might suggest that people use ambiguity as an excuse to share less with others if the stakes at play are high, it confounds two forces, the effect of stakes and that of ambiguity. A direct test of such a claim requires a treatment, in which people share 1,000€ with a charity of their choice under certainty. Nevertheless, the necessary sample size for such an exercise requires at least 100 additional subjects, corresponding to $100 \times 1,000 = \$100,000$.[12]

To test whether people use ambiguity as an excuse to share less while distributing 1,000€, we extrapolate how much people would donate in a treatment described above on basis of the effects documented in the literature on the role of stakes in the DG under certainty. For instance, List and Cherry (2008) report an average giving of 33% for a \$20 and \$28.31 for a \$100 pie. Leibbrandt et al. (2015) find considerably more selfish behavior under high stakes: the average giving is 25% for 100 (Bangladeshi) Taka and 3.67% for 10,000 Taka. In contrast, Andersen et al. (2018) document *more generous behavior* for high stakes: the average increases from 11.2% in a five-euro DG to 16.94% if 50€ are distributed.

[12]Note also that the common approaches to overcome such a problem, such as paying to a certain number of randomly chosen subjects, necessarily introduces uncertainty as discussed in Section 1 and is thus out of the question.

An important source of heterogeneity across the studies is the multiplication factor, f. For example, List and Cherry (2008) compares \$20 and \$100 pies, corresponding to a multiplication factor $f = 5$, Andersen et al. (2018) moves from 5€ to 50€ ($f = 10$), or Leibbrandt et al. (2015) compare endowments of 100 and 10,000 Taka ($f = 100$). We organise the existing 12 studies in 5 groups in function of the factor f as follows:[13]

- $f = 5$ (3 studies): Raihani et al. (R1, R3) and List and Cherry (LC1).
- $f = 10$ (5 studies): Novakova and Flegr (NF1); Andersen et al.(AGKM1); Carpenter et al. (CVB1), and Raihani et al. (R2, R4).
- $f = 100$ (2 studies): Novakova and Flegr (NF2) and Leibbrandt et al. (LMN1).
- $f = 1K$ (1 study): Novakova and Flegr (NF3).
- $f = 10K$ (1 study): Novakova and Flegr (NF4).

For each study i, we compute the treatment effect for a unitary variation of the multiplication factor. Formally, $\hat{\beta}_{f_i} = \frac{x_H - x_L}{f_i}$ where x_H and x_H are the average fraction of the pie share in the high and low treatments, respectively, and f_i is the multiplication factor in study $i = 1, 2, ..., 12$. Table 1 in the Appendix lists the treatment effects $\hat{\beta}_{f_i}$ for each study under scrutiny. With these $\hat{\beta}_{f_i}$ in hand, we compute the average treatment effect for every group $f \in \{5, 10, 100, 1K, 10K\}$. The shaded bars in Figure 3 plot such average treatment effects in function of f, illustrating how giving varies with the manipulation of stakes in the literature. The impact of stakes is always negative: people decrease their donations for higher stakes.[14] However, the effect decreases gradually. It is large for small multiplications factors, moderate per medium variation in stakes, and Figure 3 suggests that the

[13]See Appendix A.4 for a more detailed description of the studies.

[14]This is true in all the studies under scrutiny, except Andersen et al. (2018).

effect virtually disappears for very large multiplication factors ($\hat{\beta}_f < 0.005$ for $f = 1K, 10K$).

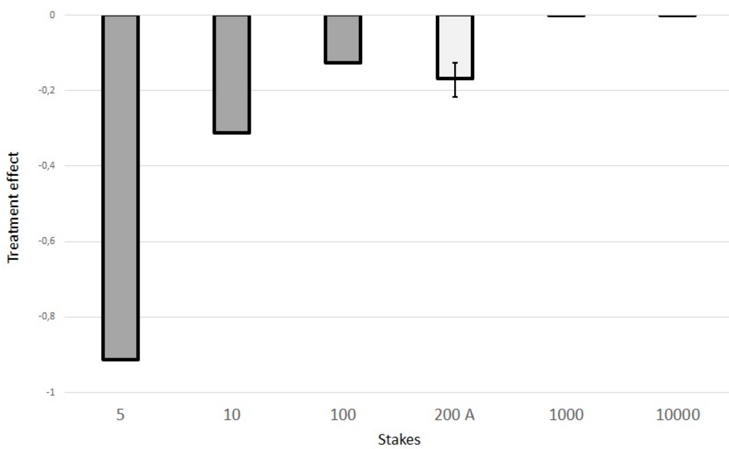

Figure 3: The effect of stakes on giving: Certainty (shaded bars) vs. ambiguity (white bar with 95% confidence interval.)

Most importantly, Figure 3 allows to extrapolate which is the likely effect of $f = 200$ under certainty. In particular, the figure shows that the effect might lie somewhere between $\hat{\beta}_{100} = -0.126$ and $\hat{\beta}_{1K} = -0.004$. Study II provides the treatment effect in our DGs under ambiguity: $\hat{\beta}_{SII} = -0.163$, included in Figure 3 (see the white bar). Our estimated treatment effect is slightly higher than $\hat{\beta}_{100} = -0.125$ but the latter value lies within the interval $[-0.2079; -0.1176]$, the 95% confidence interval of our estimated treatment effect (see the horizontal bars in Figure 3).[15] Hence, we cannot reject that high stakes affect giving under ambiguity in our data as much as it does under certainty for $f = 100$. Moreover, note that $\hat{\beta}_{100}$ is computed on basis of two studies: Novakova and Flegr (2013) use hypothetical payments and report a per-unit treatment effect of -0.036 and Leibbrandt et al. (2015) report an

[15]We use a simple linear regression with robust standard errors to estimate our treatment effect for unitary change of the multiplication factor f in Study II to test whether the treatment effects differs from the analyzed studies. If we use either ordered-logit or censored regressions instead, the conclusion that people do not exploit ambiguity to give less is never affected.

effect of -0.2156 using monetary incentives. Our treatment effect falls in between these two values: it is statistically higher than the former ($F = 40.02; p < 0.0001$) while statistically lower than the latter ($F = 4.82; p = 0.029$). Hence, we conclude that–as Study I–we find no evidence that people use ambiguity as an excuse to give less in our $DG1000A$.[16]

Result 3: *People do not use ambiguity as an excuse to give less under 1,000€.*

5 Study III: Replication

Study III tests whether the results of Studies I and II can be replicated with a new sample of subjects and a minimum design change.

5.1 Sample, design and power

Sample: For an average effect of 0.4SD, with a power of 0.8 and a significance level of 90%, we need a sample size of $n = 200$ baseline + 2 treatments (see Appendix A.1). Study III comprises 214 participants (73.364% females).

Experimental tasks: In Study III, subjects faced the three DG (DG5, DG5A, and DG1000A) against a charity of their choice, the three of them involving real money and following the same experimental protocols as in Studies I and II.

Order effects and random assignment: We ran all the possible sequences of the three DG and subjects were randomly assigned to their treatment (order) with $p = 1/6$. The following list contains all the possible game orders, where $t = 0, 1, 2$ refers to the first, second, and third decision, respectively:

[16] Our estimated effect is statistically higher than that of $f = 1K$ in Novakova and Flegr (2013). However, we give more weight on Leibbrandt et al. (2015) for two reasons. First, $f = 1K$ is considerably higher than $f = 200$, implemented in our study. Second, the payoffs in Novakova and Flegr (2013) are hypothetical while Leibbrandt et al. (2015) pay their subjects and the stakes are worth months of average income.

T0: Sequence $DG1000A_0 \rightarrow DG5_1 \rightarrow DG5A_2$ ($n = 37$).

T1: Sequence $DG1000A_0 \rightarrow DG5A_1 \rightarrow DG5_2$ ($n = 36$).

T2: Sequence $DG5A_0 \rightarrow DG1000A_1 \rightarrow DG5_2$ ($n = 36$).

T3: Sequence $DG5A_0 \rightarrow DG5_1 \rightarrow DG1000A_2$ ($n = 37$).

T4: Sequence $DG5_0 \rightarrow DG5A_1 \rightarrow DG1000A_2$ ($n = 34$).

T5: Sequence $DG5_0 \rightarrow DG1000A_1 \rightarrow DG5A_2$ ($n = 34$).

In order to replicate Results 1 and 2, we focus on the first choices in all treatments. More precisely, the first decisions in T0 and T1 serve to assess the behavior in $DG1000A$ ($n = 73$), T2 and T3 in $DG5A$ ($n = 73$), and T4 and T5 in DG5 ($n = 68$).

5.2 Results

Figure 4 shows the distributions of giving in $DG5_0$ (black bars), $DG5A_0$ (white bars), and $DG1000A_0$ (shaded bars). First of all, the behavior in Study III is statistically indistinguishable from Studies I and II.[17]

Second, in line with Study I, the distribution of behavior is very similar in $DG5_0$ and $DG5A_0$: many people give the 5€ to charity, many do not share, and a minority share intermediate amounts. The average donations are 41.04% in $DG5_0$ and 43.09% in $DG5A_0$, but this difference is statically insignificant in Study III ($t - test = -0.311$; $p = 0.377$). Hence, we again conclude that people do not use ambiguity as an excuse to donate less.

Last, we replicate that giving the whole pie virtually disappears if people share 1,000€ and the donations are concentrated around lower fractions. The average donation of 43.09% in $DG5A_0$ contrasts with 26.44% in $DG1000A_0$;

[17]In particular, $t = 0.273; p = 0.785$ for $DG5_0$; $t = -1.289; p = 0.206$ for $DG5A_0$ in Study I and $t = -1.135; p = 0.190$ for $DG5A_0$ in Study II; and $t = 0.719; p = 0.473$ for $\mathrm{DG1000A_0}$.

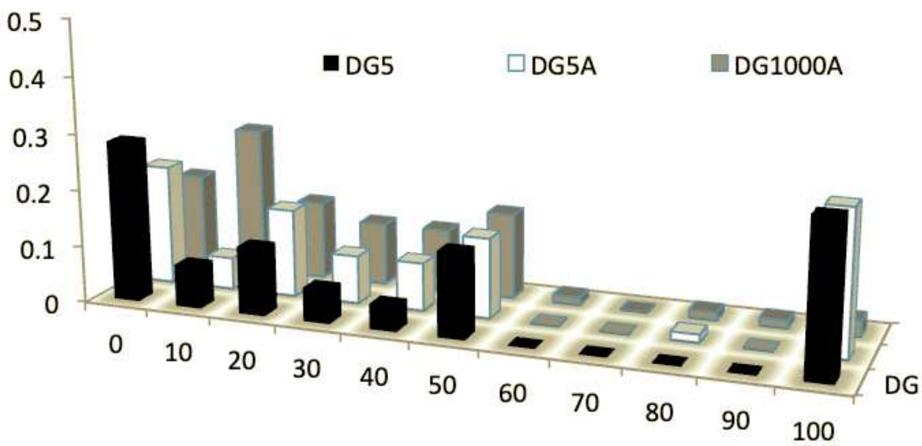

Figure 4: Donations in $DG5_0$, $DG5A_0$ and $DG1000A_0$

the difference is statistically strong ($t - test = 3.185$; $p < 0.0001$). This corroborates Result 2: people decrease their giving under ambiguity if stakes are high.

Result 4: *Results 1 and 2 are replicated.*

6 Conclusions

This study analyses whether people exploit the moral wiggle room and how this depends on the stakes at play. We particularly focus on ambiguity as an excuse to donate less to charities out of 5€ or 1,000€.

We find an important effect of stakes on donations, but we reject the hypothesis that people exploit the moral wiggle room generated by the ambiguity. This result contrasts starkly with the previous literature. We attribute this differences to one particular feature of our design: we do not introduce any uncertainty through our payment mechanism. We pay for all the decisions and the payment is independent across the decisions. We leave for future research to analyze to what extent random payment schemes influence giving under uncertainty and human behavior more generally.

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Appendix

A.1. Power calculations

In order to determine the simple size, we perform power calculations. First, the average dictators' donation in the literature is around 27% or 28% (Engel, 2011; Brañas-Garza et al., 2013), corresponding to 3€ in a DG with 10 euros. Assuming a standard deviation of 1.5€, we focus on two scenarios:

- one where the treatment increases/decreases donations by 20% (i.e. 0.4SD) and
- another one in which it increases/decreases by 30% (i.e. 0.6SD).

For an average treatment effect of 0.5SD with a power of 0.8 and a significance level of 90%, we need a sample size of $n = 90$ in the case of a single treatment (control + treatment), and $n = 135$ in case of two treatments (control + treatment 1 + treatment 2). The corresponding figures for 0.4SD are $n = 136$ and $n = 204$. For 0.33SD, the necessary sample size rises to $n = 200$ and $n = 300$, respectively.

In this paper, we have a control and one treatment in Studies I and II; in Study III, we have a control + two treatments. Hence, in Studies I and II, we decided to take the most conservative option: an average effect of 0.33SD with a power of 0.8 and a significance level of 90%. Therefore, the minimum sample sizes in these studies are of $n = 200$.

Since Study III is a replication, we are less demanding a target an average effect of 0.4SD, with a power of 0.8 and a significance level of 90%, leading to a sample of at least $n = 204$.

A.2. Study I: Transition from t_o to t_1

Here, we focus on participants' second decision. It has been reported in the literature that subjects "learn" to give less across games (Engel, 2011) but also that they take moral licenses in repeated settings, typically starting being generous (see Brañas-Garza et al., 2013). Both effects would thus go in the same direction in $t = 1$. As a result, we expect subjects being more selfish in the second round of a repeated DG. In the following, we name "second-round effect" the decrease in giving from t_0 to t_1. We have two treatments (game orders) in Study I:

$DG5_0 \rightarrow DG5A_1$ Subjects move from certainty to ambiguity (i.e., we introduce ambiguity in the second decision) and,

$DG5A_0 \rightarrow DG5_1$ subjects move from ambiguity to certainty (i.e., we remove ambiguity in the second decision).

We expect a weaker second-round effect in the former because ambiguity increases generosity (Result 1) while a reinforced second-round effect in T1 since ambiguity has been removed.

First, we study within-subject variations from t_0 to t_1 . In T0, we test whether the introduction of ambiguity mitigates second-round effect. Subjects donate 39.32% under certainty (t_0) and subsequently 36.34% under ambiguity gave in t_1. That is, they decrease giving by 2.98%, a difference that is insignificant ($t - test = -0.537$; $p = 0.296$).

Second, we analyze whether removing ambiguity reinforces second-round effect. Subjects donate 50.79% under ambiguity (t_0) and 37.70% under certainty (t_1). Such an effect of 13.09%, is significant at 2% ($t - test = -2.32$; $p = 0.011$).

We therefore conclude:

Result A1: *The introduction (removal) of ambiguity ameliorates (boosts) second round effect.*

Observe that Result A1 reinforces the arguments against the hypothesis of excuse-driven behavior.

A.3. Study II: Transition from t_o to t_1

We repeat the analysis from previous section. Again, there are two treatments (game orders):

$DG5A_0 \rightarrow DG1000A_1$ Subjects move from small to large stakes ambiguity (therefore we introduce high stakes in the second decision).

$DG1000A_0 \rightarrow DG5A_1$ Subjects move from large to small stakes under ambiguity (therefore we remove high stakes in the second decision).

Since high stakes affect giving negatively (Result 2), we expect a larger second-round effect in the former and smaller one in the latter order.

Individuals are indeed less generous (within-subjects) when they move from small to large stakes under ambiguity: 51.22% vs. 24.86%. This corresponds to a decline of 26.41%; a change that is highly significant ($t = 7.383; p < 0.0001$). Second, moving from high to small stakes under ambiguity leads to average donations of 18.67% and 16.53%, respectively. This difference is small and insignificant ($t = 1.075; p = 0.142$). We thus conclude:

Result A2: *The introduction (removal) of high stakes under ambiguity increases (ameliorates) second round effect.*

This is consistent with Result 2 and reinforces the hypothesis that high stakes under ambiguity reduce subjects' generosity.

A.4. High stakes in the Dictator Games under certainty

Table 1: List of studies analyzing stakes in the DG under certainty and their average treatment effects.

Study	Multiplication Factor	$Giving_l$ (%)	$Giving_h$ (%)	Treatment effect $\hat{\beta}$
Novakova and Flegr 1 (NF1)	10	28.30	27.90	-0.04
Novakova and Flegr 2 (NF2)	100	28.30	24.70	-0.036
Novakova and Flegr 3 (NF3)	1000	28.30	23.60	-0.005
Novakova and Flegr 4 (NF4)	10000	28.30	23.30	-0.001
Andersen et al. (AGKM1)	10	11.20	16.94	0.574
Carpenter et al. (CVB1)	10	33.00	25.00	-0.800
Raihani et al. 1 (R1)	5	48.80	48.00	-0.200
Raihani et al. 2 (R2)	10	47.80	37.00	-1.200
Raihani et al. 3 (R3)	5	54.40	48.00	-1.600
Raihani et al. 4 (R4)	10	48.90	48.00	-0.100
Leibbrandt et al. (LMN1)	100	25.00	3.67	-0.213
List and Cherry (LC1)	5	33.00	28.31	-0.938