Expected Behavior in the Dictator Game

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February 5, 2009

Abstract

This paper provides novel results for the extensive literature on dictator games: recipients do not expect dictators to behave selfishly, but instead expect the equal split division. We performed a field experiment in Baja California among a population of unexperienced subjects. Using monetary incentives we find that only 10 percent of subjects correctly guessed the expected Nash equilibrium payoff (zero). In sharp contrast, the modal subject predicts the equal split.

The predictions made by dictators are notably different: 45% predicted the zero contribution and 40% expected the equal split. Surprisingly, their actions are uncorrelated with their predictions: they choose a donation in the interior of the interval. We conjecture that the equal split is the natural solution to the problem but because the dictators are involved, they also consider the chance of keeping the complete pie for themselves. Dictators solve the puzzle by passing a positive amount of money which reflects the tension between fairness and self-interest. In consequence, any giving smaller than the equal split division may not be considered altruistic behavior. Only a donation larger than the 50/50 split would reflect generosity.

Keywords: expectations, dictator game, equal split, guessing.
JEL codes: C91, D63, D64.

1 Introduction

> *...the observed non-rational behavior in some (social) games, such as the prisoner's dilemma, might be explained simply by the framing of the game. This frame triggers a social norm that the players are accustomed to using when going about their everyday affairs.*
>
> BINMORE (2006)

The literature regarding dictator games (DG *for* short) has shown two salient results: *i*) a huge number of individuals deviate from the predicted Nash behavior (donating zero); *ii*) on average, subjects donate around 10-20% of the total endowment. In sum, they do not keep the complete pie but they are also far from the equal split, i.e. the fair division. These discrepancies seem to reflect a tension between selfishness and generosity.

Interestingly, it is well-established in the literature that the DG is a proper tool for measuring altruism since subjects freely (and anonymously) decide over making a donation or not. However, this interpretation has received criticism in the past: Hoffman et al. [19] indicate that the observed altruism is just caused by framing (a result clearly proven in Brañas-Garza [10] and to a much greater extent in List [22]). In a another line, Frohlich et al. [18] consider that the absence of social context – within a lab experiment– generates doubts which explain the low level of generosity (a similar argument to Eckel & Grossman [17])[1]. Other authors claim that subjects donate due to the lack of anonymity (see Bolton et al. [7])[2]. As Dana et al. [15] note:

> *For example, people in situations such as the dictator game might be averse to appearing unfair, either to themselves or to others. Thus, the underlying motivation driving much fair behavior observed in experiments might be self-interest, coupled with a desire to maintain the illusion of not being selfish.*

Binmore [6] and Levitt and List [21] note that the properties of the situation may trigger any social norm. According to Levitt and List [21], the power of such norms move subjects' choices far from the subgame-perfect refinement. For Akerlof & Kranton [4] or Charness & Dufwenberg [13], subjects feel bad if they do not follow the norm; an effect that will be potentiated by another salient characteristic of the DG: "transparence" (see Dana et al. [15]). The dictator clearly observes the consequences of his actions and responsibility is not easily diffused.

Throughout this paper I offer experimental evidence of the salience (and the limitations) of the equal split as the moral rule driving decisions in this game. This rule has a notable effect on dictators' behavior: they have to compare the fulfillment of the rule with their own (selfish) interest.

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[1] *For a good survey of this literature see Meier [23].*

[2] Surprisingly, Dufwmberg and Muren [16] do not find any effect when dictators donate in front of an auditorium *crowded with people.*

To do so, I asked recipients how much money they expect[3] to earn in the DG, that is, how they expect dictators to divide the pie. To complete the puzzle, dictators were also asked (hypothetically) about the choices made by other dictators. Hence, I obtained information about how people expect other people to behave in the DG. I consider an advantage of expectations (vs. actions): when subjects expect (rather than acting by themselves), certain considerations such as personal involvement, property rights, etc... are not so strong. Thus, we find that the actions are driven by more pure motivations.

Extreme care has been taken in the design so as to solve the problems noted above. Following Hoffman et al. [19], I used neutral instructions in which subjects were told that even keeping the whole pie was acceptable. To solve the lack of social context (see Frohlich et al. [18] or Eckel & Grossman [17]) induced in any regular lab experiment, I ran a single experimental session under similar conditions to those of field experiments: unexperienced subjects doing real tasks in the school auditorium. Finally, to give more relevance to the experimental results I used a larger amount of money than previously used in the literature.[4] The above modifications make these results more illustrative and credible.

Regarding the subjects' tasks, the experimental design is simple and intuitive. First, twenty-eight 1st movers (dictators) completed the typical decision task using a completely anonymous procedure involving envelopes. A question about the behavior of other dictators was also included in the questionnaire the subjects filled out at the end of the experiment. Once the first group had finished, twenty-eight 2nd players (who had been waiting outside the room) entered the same room. This second players were given the instructions that the dictators had received and were asked to guess the amount of money they would earn (as recipients). A scoring rule with monetary incentives motivated them to make accurate guesses.

The results are substantive: i) only 3 recipients (out of 28) guessed the Nash contribution (zero) and 35% of them (the modal value) predicted the equal split; ii) 45% of the dictators predicted the zero contribution and 40% expected the equal split.

My main claim is: if the equal split is the norm triggered by the DG, then any donation smaller than the equal split is not altruism. On the contrary, this deviation from the center (50/50) should be the consequence of the lack (or lesser relevance) of social norms within the subjects' utility function.

Following the introduction, the experimental design is explained in section 2, results are shown in section 3 and the contribution of this paper is discussed in section 4.

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[3]There are very few papers about expectations in dictatorial decisions. Aguiar et al. [1] and [3] are references in this field.

[4]The whole size of the endowment was 200 Mexican pesos ($\simeq$ 15 US$ $\simeq$ 14 Euros). Not only is this amount of money 50% more than the general framework (10 US$), but we must also consider the difference in terms of individual income plus cost of living in this (poor) region of Mexico. For instance, 200 pesos is enough to buy 25 beers at any canteen in La Paz. In Spain, this would cost no less than 37.5 euros (over 40 US$).

2 Experimental design

To run the experiment I use very standard instructions (see additional materials) avoiding words such as sharing which emphasize generous behavior. Moreover, subjects received clues indicating that keeping *the entire endowment* was explicitly allowed.

Students were recruited by a professor of biology by means of posters placed around the school. All of the posters read "Do you want to earn some money?", and provided an e-mail for participants to sign up. The entire recruitment process was carried out the week prior to the experiment (performed Monday, 25 September 2006) while I was in Spain. On the day of the experiment, 56 subjects waited in the central plaza of the school near the auditorium. Twenty-eight subjects were randomly selected as dictators, while the remaining subjects were asked to wait for 15 minutes.

Dictators: The dictators received a package including a large brown envelope containing another smaller white envelope inside (for dictators' payoffs)[5], ten 20-mexican peso bills (200 pesos$\simeq$ 15 US$ $\simeq$ 14 euros) plus a survey and instructions. The instructions explained the division problem and indicated that the recipient would be randomly selected from among the participants waiting outside.

After I read the instructions aloud, the subjects were instructed to do the task privately with the help of the large envelope. They were told to place the money they wished to keep (for themselves) in the small envelope, seal it and put it in their pockets. The money they wished to donate (to the recipients) had to remain in the big envelope.

Once they finished, they filled out a short survey. After this, they were asked to give us the survey and sign a blank[6] receipt form. They left the instructions and the large envelope (with the donation) on their table.

Among other questions contained in the survey, dictators were asked about their expectations regarding other dictators' donations (item #4).[7] I decided to use this hypothetical survey instead of an incentivized guess (see recipients section) to speed up the experiment.[8]

When the recipients were asked to come in, the dictators left by the back door. Communication among them was impossible.

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[5] A brown Columbian envelope measuring 25.4x33.0 cm. and a white Columbian envelope measuring 10.5x24.1 cm.

[6] Given that donation was strictly confidential, we could not ask them to reveal the amount of money they kept.

[7] Item #4 says: With regard to the task (the division) –> what do you think the other subjects have done?

[8] There is a second motivation *for making* the test hypothetical. Whereas each recipient guesses the size of the donation he will receive, dictators are not matched to other dictators. So naturally they will guess the average (except for themselves) donation of the dictators. But the average is not an integer number.... and this fact would complicate comparisons. Our strategy seems more simple and natural.

A final concern was about anonymity: how to keep it and pay dictators for their accurate prediction?

Recipients: Each of the 28 participants was seated 2 meters away from the place where their respective dictator had been seated (and were he left the big envelope). Recipients received the instructions (not the envelope) that their corresponding dictators had left. I explained that these instructions belonged to the previous participants and then read them aloud carefully. They also received additional written instructions for their specific task.

The main task was then explained. They were informed that they would get the money in the brown envelope for sure (whatever amount of money), but that they also could earn an additional amount of money.

- 80 additional pesos if they guess the right number (of bills in the envelope)

- 20 if they fail by just one unit,

- otherwise, they will receive zero additional money.

Once they had finished guessing and put their choices aside, I went with them to open the envelope and solve the game. I gave them the donation plus 80, 20 or 0 additional pesos. Afterwards they filled out a survey and signed a regular receipt.

Why Mexico? There are three reasons: the first (main) reason why I chose the Universidad Autonoma de Baja California Sur (UABCS) at La Paz (Mexico) was that, as far as I knew, no one had ever run any experiments of this kind there. The city of La Paz is 1000 miles from San Diego, thus the whole population was completely unexperienced. This is relevant because subjects (both dictators and recipients) may not have any well-documented prior knowledge about it. I assumed that this lack of information was strictly necessary to achieve clean results.

Second, I was interested in comparing these "real" results with lab evidence. To do so, I used identical instructions to those used in experiments in Granada. Thus, I needed a Spanish-speaking country.

Finally, I chose this (poor) region of Mexico because I was interested in exploring "income effects". The amount of money I used for the experiment made a difference.

Replications: To check the robustness of our experiment we compared our Mexican results with Spanish data.

- The dictatorial decisions arise from 27 Spanish students at the University of Granada who participated in a DG experiment in January 2006 under very close, but not identical conditions[9] to those of the Mexican session.

- The Spanish data on guessing was collected in May 2008: I replicated the guessing experiment at the University of Granada. I invited 27 students (recruited by standard procedures) to the lab and followed a very similar

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[9]Both use the same neutral instructions but *differ in terms of* some features. *At the University of Granada,* subjects are familiar with experimental economics since we run a lot of experiments, the session was conducted in the lab, and the amount of money was clearly smaller (5 euros + a 2 euro show-up fee). More information is provided in Brañas-Garza [10].

procedure to the one in Mexico. When the students arrived at the lab they found the experimental instructions and the donations made by Spanish students during the previous dictator game (explained above). They were asked to guess the donation contained in the envelope using the same scoring rule (5 euros for right answers, 1 euro if they fail by just one unit, 0 otherwise), after which they received the donation.

3 Results

3.1 Dictators' giving

The results are summarized in Table 1. The first column (Esp) reports the giving in the DG experiment in Spain, whereas the second column contains the Mexican donations (Mex). Although there are some differences (for instance, the modal (median) value is 1 (2) for the Mexican sample and 2/3 (3) for the Spanish sample), we see that the averages are nearly identical.

The Mann-Whitney test ($Z = -0.43$; $p - value = 0.96$) supports the above affirmation. Thus, Mexicans and Spanish behave as if arising from the same population.

Table 1: Dictators' Behavior

Donations	Esp	Mex
0	5	3
1	2	7
2	6	5
3	6	5
4	5	2
5	3	6
N	27	28
Mean	2.48	2.50
Median	3	2
Mode	2/3	1

Recall that there are major differences in terms of experience, credibility and real size of the pie. It is clear that these variations do not affect dictators' behavior. This first part of the experiment supports two clear ideas:

Result *i*: a) On average, dictators donate 25% of the endowment. **b)** Changes in rewards and different experimental conditions do not vary behavior dramatically in the DG.

3.2 Recipients' guesses

Table 2 reports the distribution of guesses made by the 28 recipients involved in the experiment in Mexico (Mex) and the Spanish replication (Esp) with 27 subjects.

First, we observe that the Spanish results do not differ substantially from the Mexican results: the modal, median and mean are practically identical. In consequence, the Mann-Whitney test ($Z = -0.26$; $p-value = 0.98$) shows that both samples arise from the same population.

Let us focus on the Mexican data. There are four impressive results: i) the expected Nash equilibrium is predicted only in 3 cases; ii) in sharp contrast three individuals expected to get more than half; iii) 10 subjects guessed the equal split; and iv) on average, they expected to get 41% of the endowment.

According to the modal and the average value, it seems obvious that subjects expect a division which is compatible with the equal split, but not with the Nash equilibrium.

Table 2: RECIPIENTS´ BEHAVIOR

GUESSES	ESP	MEX
0	4	3
1	0	1
2	2	2
3	1	3
4	7	6
5	11	10
6	1	0
7	0	0
8	0	1
9	0	0
10	1	2
N	27	28
MEAN	3.92	4.14
MEDIAN	4	4
MODE	5	5

In sum,

Result ii: Recipients expect the equal split.

Although dictators systematically offer a minimal part of the pie, the recipients do not expect that dictators will behave selfishly!

3.3 Dictators' expectations

The 28 dictators involved in the Mexican experiment were also asked to guess what the other dictators would do, that is, to reveal their expectations about dictator's behavior. This information reveals what dictators believe that others, on average, will donate. Nine subjects (out of 28) did not provide any answer.

First, we check if dictators' predictions are based on their own actions. Surprisingly we find that both variables are not correlated ($LR - test = 14.09$; $p - value = 0.82$). Hence, they do not use their own behavior to form expectations about the behavior of others.

Second, we study dictators' beliefs about other dictators. Figure 1 plots the guesses for the 19 valid predictions.
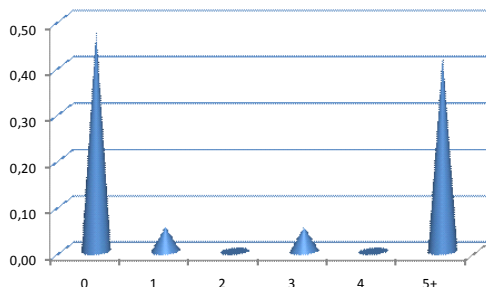

Figure 1: Dictators predictions

Dictators expected that the other dictators would donate half[10] or nothing. This picture is completely different from what we found in both Table 1 (result *i*) and Table 2 (result *ii*):

- In our experiment (like in most of the observed donations in standard DGs), the observed donations are completely different. We usually find very few 0's and 5's and many 2's and 3's.

- Moreover, this result largely contrasts with the predictions given by the Mexican recipients (who expected 50/50).

In sum,

Result *iii*: Dictators expect either a zero contribution or the equal split.

The observed polarization suggests a sort of tension between social and selfish motivations: *"giving half or nothing"* (see Dana et al. [15], see also Aguiar et al. [2]).

This is consistent with the *"involvement"* arguments shown in Brañas et al. [9]. They proved that the DG entails two simultaneous problems: first, the dictator has to divide a pie between two persons (a distributional problem) and,

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[10]The remaining 3 dictators guessed 1, 3 and 10, *respectively*. The average of the 19 observations is 2.59.

secondly, the dictator is one of the two persons involved (a fair gamble). Hence, the dictator should evaluate the cost of being fair when fairness is costly.

3.4 Summary of results

Throughout this research we find three interesting results:

- Recipients expect the equal split.

- Dictators expect both the Nash prediction and the equal split.

- Dictators offer some amount in between the zero and the equal split.

Given that the (moral or not) focal point of the equal split plays a crucial role in the DG there are two clear questions to address: *i*) why dictators (vs. recipients) add a new reference point: the zero? *ii*) why, when they solve the decision problem, do most of them chose the middle of the interval?

4 Discussion

> *.... One central idea is to view a social norm as a moral expectation, which people are inclined to live up to. We suggest that in many cases guilt aversion can provide a form of microfoundation for this. (...) guilt aversion may furnish an underlying motivation for why people behave accordingly. There is a norm, it shapes the server's expectation, and the customer lives up to this expectation because he would feel guilty if he did not.*

> CHARNESS AND DUFWENBERG (2006)

When I began this research I was highly motivated by a number of new papers reporting that generosity does not arise "only" from other-regarding preferences, but also from self-centered preferences: subjects who lose part of their identity if they do not fill the norm (see Akerlof and Kranton [4], Aguiar et al. [3]); decision makers that experience guilt if they believe they let others down (see Charness and Dufwenberg [13]); subjects who prefer to pay rather than participating in unfair situations (see Dana et al. [14] or Brañas et al. [9]), etc. The basic message of these papers is quite similar: subjects have a sort of conscience (or a well endogeneized rule) that decides what is good/bad.

For Binmore [6], some games remind players of real situations. Similarly, Levitt and List [21] argue that behavior is crucially linked not only to the preferences of people, but also the properties of the situation. My view is: the "0, 1,...,10"[11] DG triggers the moral rule of the equal split.

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[11] In a decisive paper, List [22] shows that "$-10, -9, ..., 0, 1, 2, ..., 10$" DG explains a different story: when the minimal allowed donation is negative (that is, taking money from the recipient's endowment), the dictator changes the equal split criteria $(5, 5)$ for other moral criteria: neither taking nor passing money $(10, 0)$. List [22] states: *"the social norms of the game change, providing the dictator with the "moral authority" to give nothing."*

It is worth noting that the transparency of the game – there is a direct link between dictator actions and the violation (or not) of the moral rule – enormously facilitates the triggering of the moral rule.

> "... the power of such norms can move choices consistently and significantly away from the subgame-perfect refinement." Levitt and List [21]

In consequence, when I designed this experiment I was expecting "the equal split as guessed behavior" for both dictators and recipients.[12] I must *admit* that I was impressed by the emergence of the Nash equilibria in dictators' predictions (result *iii*).

Throughout this discussion I will try to rationalize what I observed from results *i* to *iii*. My conjecture is as follows: When any subject evaluates a distributional problem –like the DG– they find a clear solution: the equal split. This is consistent with the previous papers I cited above.

However, the comparison between recipients' and dictators' expectations (results *ii* and *iii*) lead me to think that this is true only ex-ante: the dictators' involvement in the game changes the rules to be applied. When facing the problem, that is ex-post, dictators might consider not only the social rule (or the identity), but also that they are the owners of the game (see Hoffman et al [20]). Therefore when "they are part of the problem" the zero contribution emerges.

Once they evaluate the two possible solutions at hand – zero or half – they solve the problem by offering a donation between zero and half.[13] Observe that in most cases they arrive at an interior solution: $0 < giving < 50/50$ (result *i*).

Hence, I do consider that *dictators* face a tension between social rules and pure selfishness. The most simple structure would be that dictatorial choices are performed in two steps (see Figure 2).

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[12] List [22] claims: "*In the dictator game, the traditional action set invokes expectations of the givers and receivers that seemingly "demand" a positive gift, since a zero transfer is equivalent to being entirely selfish with money that an authoritative figure has just kindly endowed.*"

[13] Interestingly, only 3 (out of 28) recipients correctly guessed the observed selfish behavior, that is, most failed in their prediction. Since they are not involved in the game they just consider the ex-ante situation where the moral rule applies. Hence, they largely consider that dictators will play according to the equal split.
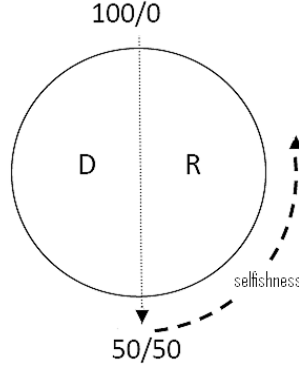
Figure 2: Decision timing

step 1) Because of a moral rule, dictators should focus on the middle of the interval when starting to solve this problem;

step 2) Second, selfish preferences drive dictators to move away from the center of the interval: the *larger* the selfish preferences, the closer the solution to zero.

This conjecture changes the standard interpretation of DG giving. *Let us assume that P is the total Pie and $p \in [0, P]$ any possible donation.*

Definition 1 (selfish) $0 \leq p < P/2$ *when subject egoism (partially) removes moral rules.*

Definition 2 (fair) $p = p/2$.

Definition 3 (altruism) $p > p/2$.

Under this classification any positive donation, but smaller than the equal split $(0 < p < p/2)$, would *no longer be considered altruistic* . We will interpret this interior solution as the tension between selfish preferences and moral issues (*conscience, identity, etc.*) within the *subject's* utility function.

Our explanation is compatible with the model of other-regarding preferences endowed with guilt aversion (Charness and Dufwemberg [12]). Our results indicate that recipients expect the equal split. If dictators are aware of these recipient expectations, then they would feel guilty if they move far from the $50 - 50$. In this case, dictators focus on the middle of the interval not because of the rule of fairness, but because of expectations. We may interpret that any positive giving (but smaller than the equal split) is the result of the intensity of guilt in subjects' preferences.

Finally, it is interesting to explore under which conditions subjects will give *more than half*. A simple explanation could be that the equal split is only a necessary condition: when the dictator-recipient comparison is not balanced, it is possible to give more than their 50%. In Brañas-Garza [11] (where dictators

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donate to people in Africa), or in Eckel & Grossman [17] (where dictators donate to the Red Cross), a large percentage of dictators donate more than 50%. In these cases subjects may assume that the utility of the transferred money should be higher than the utility of their own consumption.

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