Let Me, or Let George?
Motives of Competing Altruists

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Abstract

When a single individual's action can benefit an entire group, free-riding may increase the probability that nobody acts. Thus we have the paradoxical result that, despite technical economies of scale, larger groups function less well than smaller ones. Large groups may, however, escape this paradox if a significant minority of the population would like to *be the one* who takes a socially beneficial action, even if they believe that if they didn't take action, others would. We conduct an experiment designed to identify such individuals. Our approach differs from standard practice in experimental game theory in that we do not attempt to artificially induce social preferences by money payoffs. Instead, we seek to discover existing attitudes toward helping others by presenting subjects with a context-rich environment that is intended to evoke subjects' instinctive responses to situations where they could help others who are in need. Our experiment is specifically designed to determine the nature of subjects' altruistic motives and to allow us to classify subjects by these motives. Between fifteen and thirty-six percent of subjects, changing in

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the expected direction with costs and recognition, act as "let-me-do-it" types. Gender has no significant effect on volunteering, however the willingness and timing of volunteering does depend on whether subjects have donated blood in the past or have joined the bone marrow registry. The presence of let-me-do-it types among unpaid volunteers is sufficient to overcome the free-rider problem, unless widespread participation is needed.

"*The Lord above made man to help his neighbor…*
But, with a little bit of luck, with a little bit of luck,
when he comes around you won't be home!"

-From "With a Little Bit of Luck" by Alan Jay Lerner and Frederick Loewe, in the Broadway musical *My Fair Lady*.

I Introduction

As you drive home on a well-travelled street, you encounter a broken traffic signal or perhaps a pile of traffic-obstructing debris. You wonder whether to take the trouble to phone the authorities about this condition. You realize that many other commuters face the same choice. If someone else calls, your effort will be wasted. On the other hand, if everybody believes that someone else will call, the hazard will go unreported.

There is an interesting tension here. Technology seems to offer significant economies of scale to group size—a costly action taken by a single member is sufficient to benefit the entire group, no matter how large the group. But as the example suggests, as group size increases, the "free rider problem" may become more acute, with each group member deciding to "Let George do it."

These considerations led Mancur Olson (Olson, 1965, Page 36) to conclude that:

> "The larger a group is, the further it will fall short of obtaining an optimal supply of any collective good, and the less likely that it will act to obtain even a minimal amount of such a good."

A sociologist, Andreas Diekmann, captured this tension in a simple and elegant model, with a game that he called the *Volunteer's Dilemma* (Diekmann, 1985) This is an n-player simultaneous-move game in which each player can choose either to volunteer to perform a costly action or not. If at least one person volunteers, all group members benefit while only those who volunteer must pay the cost. The Volunteer's Dilemma game has a unique symmetric Nash equilibrium, in which each player volunteers with positive probability. In this model, the larger the group, the greater is the equilibrium probability that *nobody* volunteers.

It is not hard to find examples of large social groups that have successfully overcome the free-rider problems identified by Olson and Diekmann. Wikpedia contains millions of articles, written by thousands of unpaid anonymous writers (Zhang and Zhu, 2011). Each year, in the United States, about 9.2 million people donate blood (American Red Cross, 2015). More than 10 million people in the United States and 20 million people worldwide have joined bone marrow registries, in which they promise that if needed, they will undergo a rather painful and time-consuming donation process that would be likely to save the life of a needy recipient (Sheehan-Connor, Bergstrom and Garratt, 2015). More than 12,000 computer programmers have contributed unpaid volunteer coding to the Linux operating system (Cass, 2014).

As Sugden (1982) and Andreoni (1990) have persuasively argued, success stories such as this cannot be satisfactorily explained as the interactions of consequentialist players who weigh the cost of contributions relative to their marginal effects. Evidence suggests that at least some individuals feel obliged to contribute to worthy causes, quite independently of their own effect on total contributions.

We have devised an experiment that allows us to classify experimental subjects by the motives that lead them to altruistic actions. We distinguish two types of altruists. Some subjects, whom we designate as *let-me-do-it types*, are concerned not only that *someone* does a costly good deed. They prefer to be the one who does the deed rather than to have someone else do it. A second type, whom we refer to as *last-resort types*, or consequentialist altruists, are willing to do a costly good deed if nobody else is available to do it, but would prefer that someone else does it. The experiment also identifies *no-not-me types*, who would rather leave the deed undone than do it themselves. We argue that the presence of a significant fraction of let-me-do-it types in the population can explain the success of such ventures as Wikipedia, Linux, the Red Cross blood banks, and the bone marrow registry, which would be unlikely to be sustained at existing levels by contributors with consequentialist motives.

II The Experimental Design

In experimental game theory, it is common practice to try to induce preferences with money payoffs. In these experiments strategies and payoffs are framed in a neutral way, so as not to evoke extraneous attitudes that subjects may bring to the laboratory from their experiences in similar situations. Such experiments are typically designed to investigate whether the outcome of the experiment is close to a Nash equilibrium for a game in which players attempt to maximize their money payoffs.[1]

Our approach is different. We do not assume that subjects are motivated solely by their own money payoffs. Instead, we seek to discover existing attitudes toward helping others by presenting subjects with a context-rich environment that is intended to evoke subjects' instinctive responses to situations where they could help others who are in need.[2] Our experiment is designed to determine the nature of subjects' altruistic motives and to allow us to classify subjects by these motives.

Subjects are brought in a computer lab and told that they are one of a group of n people. (There are separate treatments in which group size is varied from 2 to 8.) In each group, all but one of the group members are told that they have received a $10

[1]Examples of Volunteer's Dilemma experiments that use this approach include experiments by Diekmann (1986) and Franzen (1995) who motivated their subjects with hypothetical money payments. Examples in which actual money payments are used include experiments by Goeree, Holt, and Moore Goeree, Holt and Smith (2017) and Pate and Healy (2016).

[2]A similar use of a "context-rich" environment to expose motivations underlying altruistic actions is found in experiments conducted by Slonim and Wang (2016) that investigate subjects' willingness to donate blood.

bonus, while one member of their group was "unlucky" and did not receive the $10. Subjects are informed that if any member of the group volunteers to give up a small amount, \$$c$, the unlucky member will receive $\$10-c$, which would equalize the payoff of the volunteer and the recipient. They are told that payment from only one volunteer is needed to help the unlucky player, and this payment will be collected from the first member to volunteer. There is a 30 second time window during which subjects can volunteer to help. Before this time window opens, each subject is given an opportunity to check a box "Volunteer at the first possible instant." If a subject does not select the first instant option, then the clock starts and a screen appears showing the number of seconds remaining, along with two buttons labelled "Volunteer Now," and "Don't Volunteer," and a check-box labeled "Volunteer me at the last possible moment"[3] Participants who have not yet volunteered are not informed when anyone volunteers. Thus all players reveal their strategies, whether or not they are first to volunteer.

If there is at least one volunteer, then the group member who did not receive an initial bonus receives $\$10-c$. If a single player volunteers before anyone else, then the volunteer pays \$$c$ and receives a net payment of $\$10-c$. If there is a tie for first volunteer, then one of the tied volunteeers is randomly selected to pay the cost \$$c$. At the end of the experiment, subjects are paid their earnings from one randomly selected round. All of this information is commonly known by subjects.

We conducted four separate treatments, using a 2×2 design with two different costs of helping and treatments with and without public recognition of donors. The cost parameter is varied between $c=1$ and $c=4$. In treatments with full anonymity, no player's actions are revealed to other players.

In treatments where contributors are recognized, subjects are informed at the beginning of each session that at the end of the session, any volunteer who was chosen to give up \$$c$ in the paying round will be identified to everyone in the room. The identities of those who did not volunteer or who volunteered but were not chosen are not announced. This procedure publicly recognizes chosen volunteers, but does

[3]Buttons for first possible and last possible instances are included so that intentions can be registered without depending on quickness of reflexes.

not single out and possibly embarrass non-volunteers.

The experiment consists of thirteen rounds of play, with subjects reshuffled into randomly selected groups of varying size after each round. Each subject receives the bonus and is a potential volunteer in nine or ten of the thirteen rounds, and each subject is the unfortunate player who does not receive the bonus in three or four rounds.[4]

III Experimental Results

Figures 1-4 show the results of our experiment in each of the four treatments and for each group size.[5] For each treatment, these figures indicate the proportions who chose each of the following four options; first possible moment, the interior of the allotted interval, last possible moment, and not at all.

[4]Further details are available in appendix subsection B. Examples of the experiment screens, as well as complete instructions, are available in the online appendix.

[5]For a group of size n, the number of possible donors is $n-1$, since one group member is the unfortunate subject who is the potential beneficiary.

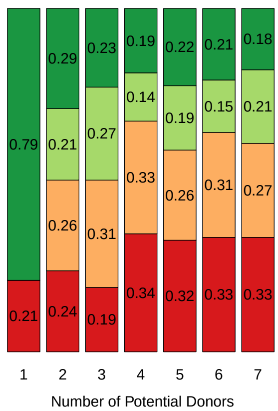

Figure 1: Contributing is Cheap and Anonymous (Treatment 1)

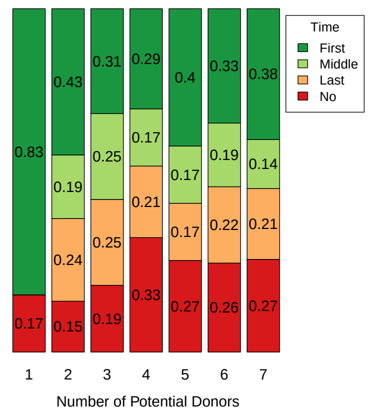

Figure 2: Contributing is Cheap and Contributors are Recognized (Treatment 2)

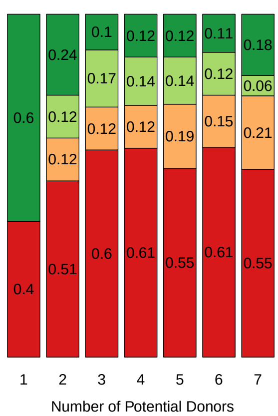

Figure 3: Contributing is Expensive and Anonymous (Treatment 3)

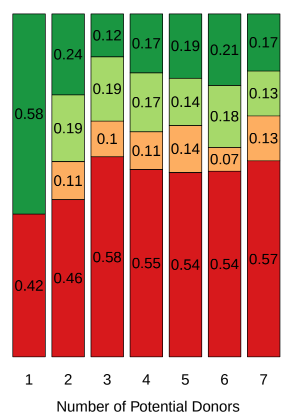

Figure 4: Contributing is Expensive and Contributors are Recognized (Treatment 4)

IV Estimating the distribution of types

A Preferences over outcomes

For each subject who is a potential volunteer in this experiment, we assume that there are four possible preference-relevant outcomes:

A) The subject volunteers and is selected to donate.
B) The subject volunteers, but another player is selected to donate.
C) Subject does not volunteer, but another player volunteers.
D) Nobody volunteers.

To organize our data, we propose the following hypothesis about individual preferences for performance of a "good deed."

Hypothesis 1. *Each player i assigns a non-negative value b_i to the deed being done, a cost c_i of doing the job himself, and a non-negative value g_i to the "warm glow" of being the one who does the deed. Player i assigns the value $v_i \geq 0$ to being a volunteer, whether or not he is chosen to do the task.*

Under this hypothesis, the utilities assigned to each of the four outcomes are as follows: $U_i(\mathbf{A}) = b_i + g_i + v_i - c_i$, $U_i(\mathbf{B}) = b_i + v_i$, $U_i(\mathbf{C}) = b_i$, and $U_i(\mathbf{D}) = 0$. Since we assume that $b_i \geq 0$, $g_i \geq 0$, and $v_i \geq 0$ it follows that $U_i(\mathbf{B}) \geq U_i(\mathbf{C}) \geq U_i(\mathbf{D})$.

Hypothesis 1 allows us to partition subjects among three distinct types according to where they rank outcome **A** relative to the other three outcomes.

- **Let-me-do-it type:** We label a subject who ranks outcome A first among these alternatives a *Let-me-do-it* type. When there is a task that needs to be done, this type would say "Let me do it." and proceed do the job, without waiting to see whether someone else is willing to do it.

- **No-not-me Type:** We classify a player who ranks outcome A last among these alternatives as a *No-not-me type*. Such a player would *not* volunteer to do the task, even if he knew that nobody else was going to do it.

- **Last-resort type:** The remaining subjects will be classified as Last-resort types. These subjects must rank outcome A either second or third among the four options. It follows that for these subjects B is their most preferred outcome and outcome D is their least preferred. When a task is to be done, this type says "If nobody else will do it, then I will, but I would rather somebody else does it."

B Mapping actions to types

Let-me-do-it Types

Recall that let-me-do-it types prefer outcome **A**, in which they volunteer and are selected to pay, over all other outcomes. In any treatment with two or more possible volunteers, volunteering at the first possible is easily seen to be a weakly dominant strategy for let-me-do-it types.

It is also easy to verify that volunteering at the first possible moment is weakly dominated for last-resort consequentialists and for no-not-me types. Therefore we expect players to select first possible moment if and only if they are let-me-do-it types.

Table 1: **Estimated Proportion of Let-me-do-it Types**

Treatment 1 $c = \$1$ *Anonymity*	*Treatment 2* $c = \$1$ *Donors Recognized*	*Treatment 3* $c = \$4$ *Anonymity*	*Treatment 4* $c = \$4$ *Donors Recognized*
0.22 (0.046)	0.36 (0.0632)	0.15 (0.036)	0.19 (0.043)

Note: Standard errors in parentheses.

No-not-me Types

In treatments where there is only one possible volunteer, the outcome will be **A** if the subject volunteers and will be **D** if she does not volunteer. It follows that subjects will not volunteer if and only if they prefer outcome **D** to outcome **A**. Therefore, the proportion of no-not-me types in the population can be estimated as the proportion of subjects who do not volunteer when they are the only possible volunteer.

Table 2: **Estimated Proportion of No-not-me Types**

Treatment 1 $c = \$1$ *Anonymity*	*Treatment 2* $c = \$1$ *Donors Recognized*	*Treatment 3* $c = \$4$ *Anonymity*	*Treatment 4* $c = \$4$ *Donors Recognized*
0.21 (0.059)	0.17 (0.063)	0.40 (0.071)	0.42 (0.072)

Note: Standard errors in parentheses.

Last-resort-types

In treatments with more than two possible volunteers, subject behavior does not cleanly separate last-resort types from no-not-me types.

For last-resort types, volunteering at the last possible moment dominates volunteering at any earlier time. But a last-resort type who believes that others are very likely to volunteer may prefer to not volunteer and thus avoid the risk of being chosen when another volunteer is available.

When there are many possible volunteers, it may also be that a no-not-me type, believing that he is unlikely to be selected, would choose to volunteer, thus gaining the reward v_i for volunteering with little risk of paying the cost c of helping.

To estimate the proportion of last-resort types in the population, we note that our theory predicts that subjects will volunteer at the last possible moment or not at all if and only if they are either last-resort types or no-not-me types.

We have an independent estimate of the proportion of no-not-me players, which is the proportion of players who choose not volunteer in the treatments with only one possible volunteer. Therefore we estimate the proportion of last-resort types as the difference between the proportion of subjects who choose either last possible moment or not at all in sessions with more than one possible volunteer and the proportion who choose not to volunteer when they are the only possible volunteer. These estimates appear in Table 3.

Table 3: **Estimated Proportion of Last-resort Types**

Treatment 1 $c = \$1$ *Anonymity*	*Treatment 2* $c = \$1$ *Donors Recognized*	*Treatment 3* $c = \$4$ *Anonymity*	*Treatment 4* $c = \$4$ *Donors Recognized*
0.38 (0.075)	0.29 (0.066)	0.15 (0.071)	0.23 (0.068)

Note: Standard errors in parentheses.

Other Types

If subjects always act to optimize their preferences among the four outcomes, A, B, C, and D as described in Section A, then they would never volunteer at an intermediate time, between the first possible moment and the last possible moment. But our results show that 15-20 percent of subjects volunteer at some time between the first and last possible moment. How do we explain their behavior? Some subjects may choose intermediate times simply because they do not think through the consequences of alternative actions and pick an intermediate time as a compromise between more extreme actions. But some players may choose an intermediate time because they have altruistic sentiments toward other possible volunteers. Such a player might like to be the one who makes a donation, but would be reluctant to crowd out another, more eager volunteer. We will not attempt to untangle the motives of such individuals, but classify those subjects who volunteer at an intermediate time as being of *Other* type.

Table 4: **Estimated Proportion of Other Types**

Treatment 1 $c = \$1$ *Anonymity*	*Treatment 2* $c = \$1$ *Donors Recognized*	*Treatment 3* $c = \$4$ *Anonymity*	*Treatment 4* $c = \$4$ *Donors Recognized*
0.19 (0.042)	0.18 (0.044)	0.12 (0.025)	0.16 (0.040)

Note: Standard errors in parentheses.

V Treatment Effects

The theory of subject motivations that we offer in Hypothesis 1 has some comparative statics predictions for the effects of treatment variations in cost, anonymity, and group size. Here we explore these predictions and compare them to observed results.

Recall that when the cost of helping is c, Consumer i assigns utilities as follows: $U(\mathbf{A}) = b_i + v_i + g_i - c$ to the outcome in which i volunteers and is selected to pay, $U(\mathbf{B}) = b_i + v_i$ to the outcome in which i volunteers and someone else is selected to pay, $U_i(\mathbf{C}) = b_i$ to the outcome in which i does not volunteer and someone else does, and $U_i(\mathbf{D}) = 0$ to the outcome in which no one volunteers.

Let-me-do-it types must rank outcome A first among these four possibilities. This requires that $U_i(A) \geq U_i(B)$, which means that $b_i + v_i + g_i - c \geq b_i + v_i$, or equivalently, $g_i \geq c$.

No-not-me types must rank outcome A last among the four possibilities. This implies that $U_i(A) < U_i(D)$. Thus, for No-not-me types, it must be that $b_i + v_i + g_i - c \leq 0$, or equivalently, $b_i + v_i + g_i \leq c$.

For Last-resort types, it must be that $U_i(B) > U_i(A) > U_i(D)$. This implies that for this type, $b_i + v_i > b_i + v_i + g_i - c > 0$, or equivalently, $b_i + v_i + g_i > c$ and $g_i < c$.

This partition of the parameter space into types is shown in Figure 5 with $b_i + v_i$ on the horizontal axis and g_i on the vertical. The expected fraction of the population falling into each of these categories is determined by the density function of the parameter values g_i and $b_i + v_i$ and by the experimentally assigned value of c.

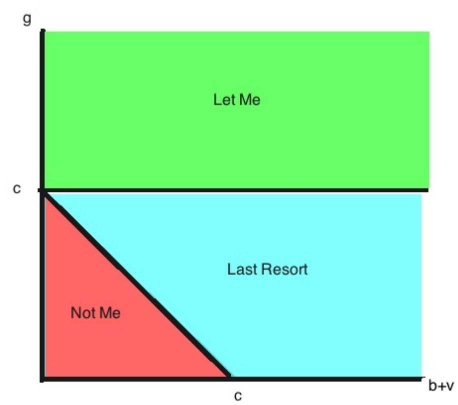

Figure 5: Parameter Distribution and Types

A Predicted Effect of Cost of Helping

Figure 6 shows the qualitative effects of increasing the cost of helping from c to c'. We see that the parameter region yielding let-me-do-it preferences expands and the set of parameters yielding no-not-me preferences contracts. Thus, our theory predicts that as the cost of helping is increased, the fraction of players who act as let-me-do-it types will decrease and the fraction who act as no-not-me types will increase. The parameter region for last-resort types loses some area to the no-not-me types and gains some area from the let-me-do-it types. Thus there is not a clear prediction of whether the fraction of last-resort consequentialist types will increase or decrease.

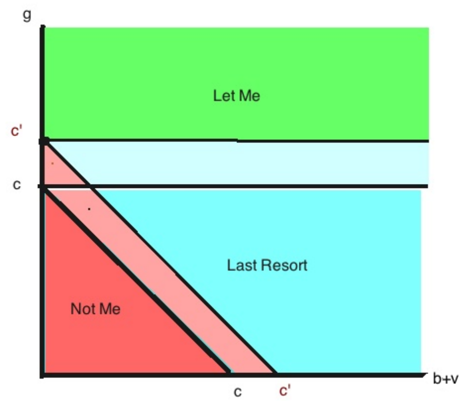

Figure 6: Shift in Type Distribution with Increased Costs

We can check these predictions by comparing Treatments 1 and 3, where volunteering remains anonymous with costs of helping set at \$1 in Treatment 1 and \$4 in Treatment 3, and also by comparing Treatments 2 and 4, where those who make contributions are publicly recognized with costs of \$1 in Treatment 2 and \$4 in Treatment 4. Tables 1 and 2 show that in the treatments with no recognition, when the cost of donating increased from \$1 to \$4, the fraction who acted as let-me-do-it types fell from 22 percent to 15 percent and the fraction of who acted as no-not-me's increased from 21 percent to 40 percent.[6] These tables also show that in the treatments where donors are recognized, the cost increase reduced the fraction of let-me-do-it types from 36 percent to 19 percent and increased the fraction of no-not-me types from 17 percent to 42 percent.[7] Thus the qualitative predictions of our theory are confirmed by the experimental data. While we do not have a theoretical prediction of the effect of cost on the fraction of Last Resort consequentialists, we see from Table 3 that in our experimental results, this fraction decreased when the cost of volunteering increased.

[6]The difference for the no-not-me types is significant at better than the 5 percent level in a t-test against a one-sided alternative.

[7]Both differences are significant at better than the 5 percent level in t-tests against a one-sided alternative.

B Predicted Effect of Recognition of Contributors

Our recognition treatment revealed the identities of those who actually contributed, but did not reveal the identities of those who volunteered but did not contribute. Thus, for any individual i, the recognition treatment is likely to increase g_i but not to affect b_i or v_i. To explore the effect of recognizing contributors, we assume that recognition amplifies the warm glow effect for each subject from g_i to kg_i, where $k > 1$. Then in Figure 7, the equation for the boundary between the no-not-me types and the last-resort consequentialists changes from $b+g=c$ to $b+kg=c$. As the figure shows, this causes the parameter region for No-not-me types to shrink, and the parameter region for Let-me-do-it types to grow. The region for Last-resort types gains some area from the no-not-me types, but loses some area to the let-me-do-it types. Thus our theory predicts that the fraction of let-me-do-it types will be larger and the fraction of no-not-me types to be smaller in Treatment 3 than in Treatment 1 and likewise for Treatments 2 and 4. Depending on the joint density function of the parameters b and g, recognition could either increase or decrease the fraction who act as last-resort consequentialists.

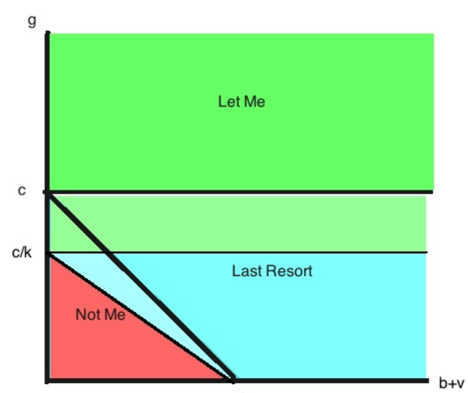

Figure 7: Shift in Type Distribution with Recognition Added

Table 1 shows that allowing recognition, increased the proportion of let-me-do-it types from 22 percent to 36 percent when helping was cheap and from 15 percent to

19 percent when helping was expensive.[8] When helping was cheap, the proportion who acted as no-not-me types was slightly smaller with recognition than without, but when helping was more costly, the proportion who acted as no-not-me types was slightly larger with recognition than without.

C Predicted Effect of Number of Players

Our theory predicts that the fraction of subjects who are classified as Let-me-do-it types should not depend on group size, so long as there are two or more possible donors. Our experimental results are consistent with this prediction for each of our four treatments. In each treatment, the hypothesis that the proportion choosing first possible moment is the same for all group sizes cannot be rejected.[9]

Our theory does not make a clear prediction of the effect of the number of possible volunteers on the fraction of the population that does not volunteer at all. As group size increases, last-resort consequentialists and no-not-me types face two countervailing effects. Suppose that players believe that the probability that each of the other players will volunteer remains constant as group size increases. For a last-resort consequentialist, the expected gain from volunteering would diminish with group size, because with more possible volunteers, the probability that nobody else will volunteer decreases. But for players who place a positive value v_i on volunteering and thus prefer volunteering without being selected to not volunteering, there is an opposing force that makes volunteering more attractive in bigger groups. Since only one volunteer is selected to pay, as group size increases, the probability that someone who volunteers is not selected to pay increases, thus making volunteering more attractive.[10]

[8]The difference in cheap contribution treatments as well as the difference averaged over the cheap and expensive treatments are both significant at better than the 5 percent level using a t-test against a one-sided alternative.

[9]The P-values in treatments 1-4 are, respectively, 0.23, 0.33, 0.30, 0.35. These come from a joint-test that in a regression of first-instant volunteering proportions on group size, the coefficient on each group-size dummy variable is identical.

[10]In fact, it is not hard to see that if all players place a positive value v_i on volunteering and not being selected, then for sufficiently large group size, there is an equilibrium in which all players volunteer, since if everyone volunteers, those who volunteer receive the benefit v_i with certainty and

Since we cannot make predictions, based on weakly dominant strategies, of the effect of group size on the fraction of subjects who do not volunteer, we might consider the predictions of the effects of group size on Bayes-Nash equilibrium for this game. In this experiment, however, subjects receive no feedback and thus have far too little experience on which to base reliable common prior probability distributions on the play of others. Moreover, it turns out that for plausible parameter values, there is likely to be more than one Bayes-Nash equilibrium and changes in group size could result in changes in in either direction of the equilibrium probability of volunteering.[11]

Though we have little theoretical guidance about the effect of group size on the probability that an individual will not volunteer, we can examine the realized effects in our experimental treatments as shown in figures 1-4. We see that in the two treatments where volunteering is cheap, the fraction who do not volunteer when there one, two, or three possible volunteers is roughly constant at about 20 percent and when there are four or more possible volunteers this fraction is roughly constant at about 30 percent. In the treatments where volunteering is more costly, the fraction who do not volunteer is about 40 percent when there is only one possible volunteer, is somewhat larger when there are two possible volunteers, and for three or more possible volunteers is roughly constant at about 60 percent.

VI Donor Activity, Gender, and Type

In addition to the decisions made by subjects in the experimental treatments we also collected information on their gender and whether or not they ever donated

pay the cost $c_i - g_i$ with probability that approaches zero as the number of players becomes large.

[11] A simple example illustrates this point. Consider a population of n players, with identical values of b, g, v, and c. Suppose that $b+v+g<c$. Then all n players will be no-not-me types and none of them will volunteer if they believe they are the only possible helper. Now suppose that $v>(c-g)/n$. If everyone believes that all of the other players are sure to volunteer, then the expected net cost of volunteering is only $(c-g)/n<v$ and all players will prefer to volunteer rather than not. Thus there is a symmetric Nash equilibrium where everyone volunteers. If everyone believes that nobody else will volunteer, then the expected net cost of volunteering is $c-b-g>v$ and thus nobody will volunteer. This gives us a second symmetric Nash equilibrium in which nobody volunteers.

blood or registered as a potential bone marrow donor with the National Marrow Donor Program. Past blood donation or the expressed willingness to donate bone marrow could be indicators of a subject's preference type, however the indication we should draw from these actions will depend upon our expectation of the subject's perception of the circumstances surrounding their decision to donate or register.

A survey of the "blood market" by Slonim, Wang and Garbarino (2014) reports that "the volunteer system (of blood donation) has performed well in most high-income countries[12]." In the United States, blood is supplied by unpaid donors. Currently, about 8 percent of those Americans who are eligible to donate blood do so in any year. So long as blood supplies remain adequate to meet demands, donors are unlikely to reason that if they do not donate, someone in need of a blood transfusion will have to do without. Thus it seems plausible that some blood donors are let-me-do-it types, motivated by a desire to personally do a good deed. On the other hand, Lacetera, Macis and Slonim (2012) observe that in recent years, volunteer sources are more frequently failing to provide adequate supplies. According to these authors the demand for blood has increased dramatically because of an aging population, and because of the availability of new medical and surgical procedures. As a result, the authors maintain, blood shortages "have become the norm rather than the exception." When there are shortages of blood, donors may realize that a decision to donate is likely to result in a blood transfusion for someone who otherwise would have to do without. In this situation, it can be expected that "last-resort consequentialists" will be induced to donate.

20 million people are registered as potential bone marrow donors. Such a large registry is desired because a volunteer's DNA type is not known until his saliva has been tested. Only 1/15 of new registrants added to the registry are of an immunity type that is not already present (Bone Marrow Donors Annual Report, 2013, Page 17.). Thus it is the case that the great majority of those who undergo the pain and inconvenience of donating bone marrow or stem cells do so despite the fact that there are other equally qualified donors who would be willing to do so. Although the world registry is very large in absolute terms, it includes only a small fraction

[12] Slonim *et al.* report that three-quarters of the countries with per capita income meeting the World Health Organization standard for higher-income countries rely on 100 percent volunteers.

of those whose age and health would make them suitable donors. In most European countries, the bone marrow registry includes less than 1 percent of the eligible population. In the United States, this fraction is about 2 percent of the population and Germany it is about 5 percent[13]. It is plausible that these registrants consist largely of let-me-do-it types, who take pleasure in saving a life, even if someone else might be available to do it.

Table 5 reports the results of three separate regressions with binary dependent variables: first moment, last possible moment, did not volunteer. The regressions are limited to observations with 2 or more potential donors. To account for the fact that we have several observations from the same subject in each regressions, we report cluster robust standard errors (at subject level). The independent variables are indicators for gender and donor statuses, as well as treatment dummies for whether those who donate are publicly recognized and whether the cost of donating is high ($4) or low ($1).

[13] We have argued elsewhere Sheehan-Connor, Bergstrom and Garratt (2015) that benefit-cost analysis suggests that an efficient bone marrow registry would be about twice as large as the current registry and thus would require participation rates similar to those obtained in Germany.

Table 5: OLS, Volunteering Actions Regressed on Gender, Donor-Status, and Treatment

	Coefficient	Std. Error	p-value
Dep. Variable: First Possible Moment			
Constant	0.23	0.059	0.000
Male	0.01	0.045	0.893
Marrow Registrant	0.14	0.076	0.059
Blood Donor	-0.05	0.045	0.262
Recognition	0.14	0.076	0.073
High Cost	-0.07	0.057	0.219
Recog. × High Cost	-0.11	0.092	0.215
Dep. Variable: Last Possible Moment			
Constant	0.23	0.060	0.000
Male	0.01	0.042	0.782
Marrow Registrant	-0.02	0.060	0.698
Blood Donor	0.10	0.043	0.021
Recognition	-0.07	0.073	0.351
High Cost	-0.13	0.063	0.039
Recog. × High Cost	0.02	0.085	0.7807
Dep. Variable Non-Volunteering			
Constant	0.32	0.059	0.000
Male	0.05	0.053	0.324
Marrow Registrant	-0.04	0.076	0.626
Blood Donor	-0.08	0.051	0.112
Recognition	-0.05	0.072	0.455
High Cost	0.27	0.070	0.000
Recog. × High Cost	0.03	0.104	0.789

Note: Standard errors clustered by subject.

Exactly half of our subjects have ever donated blood and 13 percent have registered as potential bone marrow donors. Slightly more than half of our subjects are female. Our results show no significant effect of gender on when or whether a subject volunteers. The regression coefficients suggest that a higher cost of contributing reduces the probability of volunteering at either the first or last possible moment and significantly increases the probability that a subject does not volunteer at all. Recognition of those who were selected to contribute increases the probability that a subject will volunteer at the first possible moment. These findings are consistent with the comparative statics results we presented in Section 4.

Those who have ever donated blood are no more likely than others to volunteer at the first possible moment, but are significantly more likely to volunteer at the last possible moment. Those who have joined the bone marrow registry are estimated to be 14 percentage points more likely to volunteer at the first possible moment than other subjects[14] but no more likely to volunteer at the last possible moment.

These result suggests that the *National Marrow Donor Program* may be correct in directing its registry appeals toward let-me-do-it types who are motivated to *be the one* who makes a difference. On the other hand, our data suggests that those who donate blood are no more likely behave as let-me-do-it types than the population at large, but are more likely to behave as last-resort consequentialists, who donate because they believe that if they do not, blood supplies will be inadequate.

VII Post-Game Interviews

After each round of the experiment, subjects were asked a follow-up question. Those subjects who volunteered at some time in the round were asked the following: "You volunteered to spend \$x to help Person X in this round. If it turns out that someone else offered to contribute at the same time that you did, would you prefer that we take the \$$x$ needed to help Person X from you?" Those who did not volunteer were asked: "You did not volunteer in this round. If it turns out that the others also did not volunteer, would you be willing to change your decision and spend \$$x$ to help Person X get \$$10-x$?

If subjects answer this question truthfully and if their actions are determined by their preferences over the four possible outcomes A, B, C and D, then we would expect that those who volunteered at the first possible moment would say "take it from me," while those who chose last possible moment would say "take it from the

[14]Because the number of bone marrow registrants in our sample is relatively small (23), this effect is statistically significant only at the 6 percent level.

other person". Persons who did not volunteer could be either not-me types, or last-resort consequentialists. Those who are last-resort consequentialists would respond "yes" and those who are not-me types would respond "no".

Table 6 shows the proportions of subject decisions by their action and answer to the follow-up question. While most of the subjects' answers are consistent with the expected answer, given their actions, there are some deviations that cannot be explained by our simple model.

Table 6: Action and Answers to Question

Action and Response	*Treatment 1* $x = \$1$, *Anon*	*Treatment 2* $x = \$1$, *Reveal*	*Treatment 3* $x = \$4$, *Anon*	*Treatment 4* $x = \$4$, *Reveal*
First Moment, From Me	0.17	0.30	0.12	0.09
First Moment, From Other	0.05	0.07	0.03	0.10
Last Moment, From Me	0.11	0.09	0.07	0.06
Last Moment, From Other	0.18	0.13	0.09	0.05
Not Volunteer, Yes	0.17	0.05	0.10	0.25
Not Volunteer, No	0.13	0.20	0.46	0.29

In treatments 1 and 2, and 3, more than three-fourths of those who chose to volunteer at the first possible moment answered "take it from me," and one-fourth answered "take it from the other." In In treatment 4, where, in the experiment, donors were publicly revealed subjects about half of the subjects who volunteered at the first possible moment said "take it form the other."

Why would someone choose to volunteer at the first possible moment if they prefer that someone else bear the cost of donating? By volunteering later, they can increase the probability that somebody else pays, without changing the probability that the unfortunate player is helped. The answer could be that these subjects believe that volunteering *at the first instant*, not just volunteering, is the "right thing to do."[15] Subjects may feel an ethical need to do the right thing, even though they would prefer the consequences of another action. Persons motivated in this way are

[15] To incorporate this into our model we would need to make the payoff to volunteering a function of the time at which the subject volunteers.

sometimes classified as *deontologists* [16]. This impulse to do the right thing, could be a subconscious urge that guides one's ordinary behavior whether or not one is observed. It could also stem from a view that, even with claimed anonymity, there is a chance that those who volunteer early might be observed and thus benefit from others' esteem.

When those who chose to donate at the last possible moment were asked whether they preferred to have the money taken from them, between 1/3 and 1/2 of these subjects said that they would prefer that the cost be taken from them. This is surprising because these subjects could increase the probability of the money being taken from themselves by volunteering earlier than the last possible moment. Possibly, some subjects who answered in this way simply did not understood the rules of the game or the nature of the question. It may also be that for some subjects, the reason that their answers seem at variance with their play is that they understood the post-experiment question to be only hypothetical, and when there is no cost to appearing generous, they gave the answer that a more generous person would give.

VIII Related Literature

A Discussions of Donor Motives

Andreoni (1990) proposes that a potential contributor i to the supply of public goods has preferences that can be represented by a function $U_i(x_i, g_i, y)$ where x_i is i's consumption of private goods, g_i, is i's voluntary contribution to a public good, and y is the amount of the public good and where U_i is an increasing function of all three arguments. Person i is said to feel "warm glow" from giving if U_i is an increasing function of g_i[17]. In a survey written for the *New Palgrave*, Andreoni, Harbaugh and Vesterlund (2008) cite the philosopher, Thomas Nagel's definition of altruism:

[16] According to the Stanford Encyclopedia of Philosophy, "In contrast to consequentialist theories, ... for deontologists, what makes a choice right is its conformity with a moral norm. Such norms are to be simply obeyed by each moral agent" Metaphysics Research Lab (2007)

[17] Andreoni refers to his model as an "impure public goods model" and acknowledges that essentially the same model was formulated by Cornes and Sandler Cornes and Sandler (1984).

"By altruism I mean not abject self-sacrifice, but merely a willingness to act in the consideration of the interests of other persons, without the need of ulterior motives." Andreoni *et al.* interpret a statement that i is an altruist without "ulterior motives" to mean that U_i depends only on x_i and y and is constant with respect to g_i.

Perhaps the simplest example of an "ulterior motive for giving" is the desire to impress others with one's generosity. William Harbaugh discusses the prevalence of this motivation and presents interesting evidence from a study of the reactions of donors when major law school changed the way in which it categorized donors by the size of their contributions (Harbaugh, 1998a,b). In our experiment, it appears a desire for recognition motivates a significant fraction of subjects to volunteer at the first possible moment rather than the last possible moment.

In other experimental studies, recognition has also been found to motivate contributions. Andreoni and Petrie (2004) found that in a voluntary provision of public goods game, providing the identity of potential contributors and the amount they contributed increased contributions. Savikhin Samek and Sheremeta (2014) found that only identifying the bottom two contributions in a public goods game with five potential contributors raise contributions. However, only identifying the *top* two contributors had no effect. They suggest that shame aversion appears to be a stronger motivator than desire for prestige in their experiment. Our results, on the other hand, suggest there is a strong effect of prestige. However, the structure of our game is different and the public good being provided is the welfare of another individual rather than the good-of-the-group. Both of these may be mediating factors in the motivating potential of prestige.

Andreoni (1990) suggested that some people may want to give, independently of the effect on outcomes, because of what Weesie (1993) calls "internalized social norms". People may simply feel good from doing things that they believe will serve the public interest.

In the volunteers' dilemma games of our experiment, a player who volunteers at the first possible moment evidently prefers an outcome in which he pays for the public good to one in which the same amount of public good is available, but someone else pays. If such a person has initial private wealth w_i and the cost of volunteering is $g_i > 0$, then for this individual, $U_i(w_i - g_i, g_i, y) > U_i(w_i, 0, y)$. This can be the case, only if U_i is an increasing function of g_i. Thus it must be that our let-me-do-it types, who choose the first possible moment, are warm glow types in Andreoni's terminology. But not every person who experiences warm glow will be a let-me-do-it type in all volunteer's dilemma games. Depending on the costs and the impact of a gift, subjects may experience some warm glow from giving, but not enough so that they prefer to pay the outcome where they, rather than someone else pays the cost.

Duncan (2004) discusses "impact philanthropists," who "desire to personally make a difference." In his model, impact philanthropists get disutility from the contributions of others to the quantity of a pure public good because this lessens the impact of their own donations. While there are some similarities, there does not appear to be a simple relationship between our let-me types and Duncan's impact philanthropists. Let-me types are defined by their desire to take action in a volunteer's dilemma game even when others stand ready to take action in their stead. Persons who behave in this way might or might not prefer others to donate less in a voluntary provision of public goods game[18].

Our paper uses a dynamic version of the volunteer's dilemma to identify the motives of competing altruists. This game is related to dynamic models of provision of public goods that have been presented by Weesie (1993), Bliss and Nalebuff (1984), Bilodeau and Slivinski (1996) and Bergstrom (2012). In these models, the first player to volunteer is the only one to pay the cost of volunteering. In each of these models there is a cost of delay, which could take the form of increased risk or inconvenience to a person in trouble or of delayed gratification to all participants[19]

The game that our subjects play is simpler, in the sense that the value of the reward to having someone volunteer does not depend on the amount of delay before the appearance of the first volunteer. In our experimental design, subjects are not in-

[18]Duncan's discussion does not address the question of whether impact philanthropists believe that their actions "personally make a difference" if they know that were they not to act, someone else would.

[19]Bilodeau, Childs and Mestelman (2004) use a dynamic dilemma to measure the predictive power of subgame perfection.

formed about the others' play until after they have chosen their own action. Thus, we are able to record the "strategies" of players who are not the first to volunteer as well as that of the first to volunteer.

[20,21].

In Diekmann's Volunteer's Dilemma game, players must act simultaneously and, although a single person's action would suffice, there is no coordinating device to prevent duplication of effort. Jeroen Weesie, observed that in many real-life emergencies, bystanders are able to observe each others' actions and the first person to take action bears the cost (Weesie, 1993). Weesie shows that where delayed action is costly, this leads to a formal "game of attrition" model, in which each player sets a delay threshold and the player with the earliest threshold takes the action[22].

Some real-world situations are best modeled as simultaneous-move games with an external coordinating device. A central agency asks for volunteers, and if there is more than one volunteer, the agency randomly selects a single volunteer to carry out the task. In equilibrium with such a coordinating device, players are more likely to volunteer than when all volunteers must take costly action. It turns out, however, that in symmetric Nash equilibrium, even when only one volunteer is selected, the larger the group size, the more likely there will be no volunteers[23].

[20] Barbieri and Malueg (2014) study a continuous-strategy version of Volunteer's Dilemma. Players can vary their effort levels continuously between 0 and 1 at constant marginal cost and social benefits are a concave function of the largest effort by any player. This game has a symmetric Nash equilibrium, in which each player's contribution is a random variable with support on interval an interval $[0,\bar{x}]$. In this game, as in the standard Volunteer's dilemma, there is a positive probability that each player makes zero contribution and increases in the number of players leads to stochastically lower levels of individual contributions and of the level of social benefits supplied.

[21] Leo (2015) studies a version of the volunteers dilemma in which more than one volunteer is needed to provide a public good. There too, larger groups are more likely to come up short in producing the required number of volunteers.

[22] Essentially the same result appears in the economics literature in earlier work of Bliss and Nalebuff (1984).

[23] This result is shown in papers Weesie and Franzen (1998) and Bergstrom and Leo (2015).

B Related Experiments

Perhaps the earliest experimental research on the behavior of competing altruists is a classic experiment by social psychologists, John Darley and Bibb Latané that tests for *diffusion of responsibility* as group size is increased (Darley and Latané, 1968). Subjects were confronted with a simulated emergency, which, they were led to believe, was witnessed a total of n subjects. Subjects were separated, so they could not observe each others' actions. In separate treatments, n was set at 1, 2, and 5. In each treatment, the fraction of subjects who reported the emergency was recorded. They found that the fraction of observers who reported the emergency diminished sharply as the number of observers increased, while the probability that at least one observer took action remained essentially constant[24]. Darley and Latané also recorded the amount of time that elapsed from the first signs of the emergency until subjects reported. The average amount of time that elapsed increased substantially with the number of observers [25].

In the past 30 years, many similar laboratory and field studies have been conducted with many variations in the type of emergency and characteristics of the participants and victim. Survey articles Latané and Nida (1981) and Fischer et al. (2011) show that in almost all of these studies, individual subjects are less likely to help if more than one potential helper is available. Some of these studies find that the probability that at least one observer helps increases and some find that it decreases as the number of observers is increased.

Some laboratory experiments have used real or hypothetical money payoffs to induce payoffs corresponding to Diekmann's Volunteer's Dilemma model. In these experiments, all volunteers must pay a money cost, and if someone volunteers, all plauyers receive a money benefit. Diekmann (1986) and Franzen (1995) asked subjects to fill out a questionnaire in which they stated whether they would volunteer or not in Volunteer's Dilemma games where the ratio c/b of cost to benefit was 0.5

[24]Of the subjects who believed they were the only observer, 85 percent reported the emergency. When subjects believed there was one other observer, 62 percent reported and they believed that there were four observers, 31 percent reported.

[25]This average was 52 seconds with a single observer, 93 seconds with two observers, and 166 seconds with five observers.

and with numbers of players in the group, varying from 2 to 101[26]. In both studies, as group size increased from 2 to 5, the proportion of subjects who volunteered decreased sharply but was significantly higher than Nash equilibrium predictions. In both studies, the proportion of volunteers remained roughly constant at about 30 percent for groups larger than 7.

Goeree, Holt and Smith (2017) conducted volunteer's dilemma experiments in which subjects played repeatedly with a new random selection of group members in every round. They found that the probability that a subject volunteers diminishes as the number of players increases. For groups of two persons, the volunteering rate is lower than predicted by Nash equilibrium. For group size 3, it is approximately equal to the Nash equiibrium proportion and for groups of 6 or more, the observed proportion of volunteers exceeds the Nash equilibrium prediction.

Experimental studies of asymmetric versions of the Volunteers Dilemma include Diekmann (1993); Pate and Healy (2016).

In all of the Volunteer's Dilemma experiments Diekmann (1986); Franzen (1995); Diekmann (1993); Pate and Healy (2016); Goeree, Holt and Smith (2017) that use money payoffs to induce preferences, payoffs are arranged so that every subject who attempts to maximize money payoffs would be classified in our terms as a Last-Resort consequentialist.

A recent experiment, Vesterlund et al. (2015) compares the behavior of men to that of women in a Volunteer's Dilemma game with design similar to ours. In this game, subjects are told that they belong to a group of three persons, randomly selected from among participants in the experimental session. The number of men and women who were present in each of these sessions was approximately equal[27]. If at least one of the three group members offers to pay $0.75, then all three will receive a total payment of $2. If none of them volunteer, they each receive $1.

[26]Diekmann's study had 29 subjects who stated what they would do as the number of players in the group was varied from 2 to 10. Franzen asked 203 subjects to report how they would play in games with groups of size 2, 5, 7, 9, 21, 51, and 101. Both studies paid subjects in proportion to their total winnings in all of the games played.

[27]Their study included additional sessions in which all participants were men and in which all participants were women.

They are given a two-minute time interval in which volunteers will be considered. The first player to volunteer will pay the $0.75 and thus receive a net payment of $1.25. The other group members will each receive $2. In this design, unlike ours, play ends at the moment that someone volunteers, so they are not able to record when or whether the persons who were not first volunteers would have volunteered. They estimate that men will be the first volunteer in their group in 21 percent of the rounds they play and women will be the first volunteer in their group in 34 percent of the rounds that they play.

In our experiment, players were not told whether others had volunteered, and thus we can discover the time at which each subject would volunteer, whether or not he or she is the first volunteer. We can use simulations based on our experimental data for groups of three to estimate the probability that a randomly selected man or woman would be the first volunteer in his or her group[28].

We find that, in both of the treatments where contribution is cheap, men are significantly less likely than women to be the first volunteer. However, when contribution is expensive, we find no significant difference. These results hold whether contributors are recognized or not [29]. While it is hard to map our parameters into those

[28]We simulate this in the following way. We created 10,000 samples of our data. Re-sampling is done at the subject level since our experimental design allows us to treat individuals as independent observations. There is no feedback or interaction.

Each sample is drawn so that the resulting samples have a gender composition equal to that of our original data. Multiple observations from the same person are weighted to achieve equal representation of each subject since some subjects have two observations in groups of three potential donors while some only have one observation.

From *each* bootstrapped sample, we simulate the interaction of 1000 groups of 3 subjects drawn so that average groups contains 1.5 men and 1.5 women. In each of these groups, we determine whether a man would have volunteered first if there would have been a volunteer at all. We then average this over all 1000 simulated groups to get the proportion of groups in which a man volunteered first. We calculate this proportion for all 10,000 samples. The average of these numbers is our simulated point estimate corresponding to the statistic in Vesterlund et al. (2015) that men volunteered first in 38 percent groups in which there was a volunteer. This procedure also provides the reported standard errors.

[29] For treatments one through four respectively, the simulated point estimates on the probability a man (woman) is the first volunteer are 0.36 (0.64), 0.33 (0.67), 0.43 (0.38), 0.38 (0.45).

The bootstrapped confidence intervals for the difference between the male and female proportions above (using quantiles) are (-0.53,-0.02), (-0.60,-0.06), (-0.31,0.29), (-0.32,0.28). Note that, for treatments 1 and 2 (when volunteering is cheap) men are significantly less likely to volunteer (as is the case in Vesterlund et al. (2015)). However, in treatments 3 and 4, when contributing is expensive, used in Vesterlund et al. (2015), these results are consistent with those of Andreoni and Vesterlund (2001) who find that, in a dictator game, men are less generous than women when giving is cheap, but this reverses as giving becomes expensive.

IX Discussion

One of the main advantages of forming large communities is the returns to scale generated by the fact that pure public goods can be shared by large numbers of people, each of whom would need to contribute only a small fraction of their total cost. But if Mancur Olson's claim that groups are less likely to maintain "even a minimal amount" of a public good is generally correct, then these potential returns to scale are unlikely to be realized by voluntary action.

There are, however, some impressive real-world examples in which large groups of people, acting voluntarily, are remarkably successful in providing public goods. The success of Wikipedia, the open source software movement, the bone-marrow registry, and the blood bank suggest that sometimes large groups of people can perform quite satisfactorily in the voluntary provision of public goods.

In standard economic models of the private provision of public goods, "consequentialist" agents will take a costly action only if they value the marginal effect at more than the cost. If such motives guide everyone, then the predictions of Nash equilibrium would largely concur with Olson's pessimistic conclusion.

In some cases, free-rider problems can be surmounted by the presence of a significant number of people who care not only about the marginal consequences of their good deeds, but take pleasure in (or feel obliged to) doing a public service, even if they believe that if they didn't do it, someone else would. We have conducted experiments that are designed to identify such individuals, whom we call *let-me-do-it* types.

Our results indicate that when it is relatively cheap to help a less fortunate player (costing $1 to give that player $9), about 20 percent will act as let-me-do-it types

men are no less likely to be the first volunteer.

if there is no recognition of donors and about 35 percent will do so if donors are publicly acknowledged. When it is more costly (costing $4 go give $6 to the donor), about 15 percent will act as let-me-do-it types if there is no recognition and about 20 percent will do so if donors are publicly acknowledged.

In situations like the Volunteer's Dilemma, where only one volunteer is needed to fulfill the task, the presence of a small minority of let-me-do-it types among a large number of potential helpers is sufficient to guarantee that in Nash equilibrium, the task will be performed with high probability. As group size becomes large, the probability approaches one that the group will contain at least one let-me-do-it type and since this type will volunteer regardless of the group size, the probability that there is at least one volunteer approaches one.

We have indicated that the world's bone marrow registries are a plausible example of a situation where the existence of a small fraction of let-me-do-it types is sufficient to deliver a desirable public outcome. Wikipedia is another dramatic example of a voluntarily provided public good shared by a very large number of users. Wikipedia contains about 5,000,000 articles in the English language and about 30,000 "active editors" in English. It is accessed by approximately 500 million unique users per month (Wikipedia, 2015). Almost all of Wikipedia's content is provided by anonymous, unpaid volunteers. As with the bone marrow registry, the number of potential contributors to Wikipedia is extremely large and participation by only a small fraction of potential contributors is sufficient to provide an extremely valuable resource. (In the case of Wikipedia, the number of active contributors is less than 1/10 of 1 percent of the number of users.) Those who write an article on a popular topic in Wikipeda do so, even though they can be quite certain that if they were not to do it, someone else would. Thus it would seem that most of the articles in Wikipedia are written by authors whose motives are of the let-me-do-it type.

The ability of countries to maintain adequate blood supply purely on the basis of volunteers have been less successful. Moreover, if frequent shortages are in fact needed to attract last-resort consequentialists then this will have significant social costs. Thus, as demand for blood continues to rise, the option of offering financial rewards to attract blood donors becomes more attractive. Lacetera, Macis and Slonim (2012) have done field studies that indicate that it is likely that the supply of blood would respond positively to financial rewards for donors.

Procurement of blood plasma in the US is an interesting example of a "market" which has moved from voluntary provision to paid donors. Plasma donation is much more time-consuming than blood donation, and many new uses have been found for blood plasma (Slonim, Wang and Garbarino, 2014). Evidently, at least in the US, the number of let-me-do-it types is no longer sufficient to meet plasma demand from unpaid sources. More than 80 percent of the US blood plasma supply comes from paid donors. Most of the world's high income countries, other than the US, do not allow payment for blood plasma. Thus the US has become the world's dominant source of blood plasma, contributing about 70 percent of world supply (Slonim, Wang and Garbarino, 2014).

The lives of persons in need of a kidney transplant can be dramatically improved if they receive a transplanted kidney[30]. Because donating a kidney is much more costly to the donor than donating blood or bone marrow, the fraction of the population that are either let-me-do-it types or last-resort consequentialists with respect to kidney donation falls far short of meeting the demand for transplanted kidneys. According to the National Kidney foundation Organ Donation and Transplantation Statistics, in the United States in 2014, there was a waiting list of about 100,000 people seeking kidney transplants, with about 36,000 new additions to this list per year. The supply of kidneys available falls far short of demand. In 2014, the number of transplants from cadavers was about 11,600 and about 5,400 were available from living donors. Every year, about 7,000 people from the waiting list either die or become too sick to receive a transplant. Thus, every kidney donor can be assured that his own donation will result in a healthy kidney for at least one patient who otherwise would not have received one at all[31]. This is a clear case in

[30]Live donation of kidneys is possible because people have two kidneys, and healthy people suffer little risk from donating one Roth, Sönmez and Ünver (2007).

[31]Roth, Sönmez and Ünver (2007) have developed mechanisms to facilitate multilateral kidney exchanges among pairs of people who would like to donate a kidney to a loved one but cannot because of blood-type incompatibility. This means that sometimes a volunteer donor can start a chain of several donations, none of which would have occurred without his or her donation.

which last-resort consequentialists as well as let-me-do it types will be motivated to donate kidneys. The personal cost of donating a kidney is much higher than that of donating blood or bone marrow, and thus at a donor price of zero, demand for kidneys greatly exceeds supply. Currently, the sale of kidneys is illegal in almost all countries, but since unpaid donations do not meet demand, a strong case can be made for allowing the price mechanism to induce much larger supplies[32].

In the classical model of voluntarily provided public goods, the utility of each player depends on the sum of the amounts of public goods voluntarily supplied by individuals. In an efficient allocation, the amount of public good supplied would be such that the *sum* of the all community members' marginal willingnesses to pay is equal to the marginal cost. But in an equilibrium with voluntary contributions, the amount supplied is such that the marginal willingness to pay of *any single contributor* is equal to the marginal cost. Thus in a large community where the benefits of the public good are widely dispersed among community members, the amount public good supplied by voluntary contributions in equilibrium is much less than the efficient quantity. Even the increased contributions caused by the presence of a small proportion of *let-me-do-it* types who give significantly more than would be predicted by self-interested behavior would fall far short of bringing the supply to efficient levels.

For public goods such as public parks, roads and highways, police, and sanitation, we would not expect adequate quantities to be supplied by voluntary contributions, even if a significant minority of the population took delight in paying for public goods. Thus tax-financed governments have emerged as the primary suppliers of many of the standard pure public goods.

[32] Becker and Elias (2007) present a closely-reasoned case for permitting paid donations of kidneys and other organs.

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X Appendix

A Additional Experimental Results

Table 7: Estimated Type Distribution by Group Size

	Number of Possible Volunteers					
	2	3	4	5	6	7
Proportion of Let-Me-Do-It Types						
Treatment 1	0.29	0.23	0.19	0.22	0.19	0.21
	(0.063)	(0.061)	(0.055)	(0.057)	(0.051)	(0.055)
Treatment 2	0.46	0.31	0.28	0.40	0.32	0.36
	(0.081)	(0.078)	(0.073)	(0.077)	(0.078)	(0.071)
Treatment 3	0.24	0.10	0.13	0.15	0.09	0.17
	(0.056)	(0.045)	(0.046)	(0.049)	(0.041)	(0.048)
Treatment 4	0.25	0.13	0.18	0.17	0.20	0.17
	(0.061)	(0.048)	(0.053)	(0.048)	(0.055)	(0.048)
Proportion of Last-Resort Types						
Treatment 1	0.29	0.29	0.44	0.41	0.45	0.39
	(0.085)	(0.089)	(0.082)	(0.086)	(0.088)	(0.083)
Treatment 2	0.22	0.28	0.40	0.25	0.31	0.32
	(0.081)	(0.094)	(0.079)	(0.068)	(0.075)	(0.080)
Treatment 3	0.26	0.33	0.35	0.31	0.40	0.39
	(0.084)	(0.086)	(0.077)	(0.082)	(0.073)	(0.076)
Treatment 4	0.14	0.27	0.24	0.25	0.20	0.29
	(0.071)	(0.083)	(0.068)	(0.076)	(0.083)	(0.080)
Proportion of No-Not-Me Types						
Treatment 1	0.21	0.21	0.21	0.21	0.21	0.21
	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)
Treatment 2	0.17	0.17	0.17	0.17	0.17	0.17
	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)	(0.063)
Treatment 3	0.40	0.40	0.40	0.40	0.40	0.40
	(0.071)	(0.071)	(0.071)	(0.071)	(0.071)	(0.071)
Treatment 4	0.42	0.42	0.42	0.42	0.42	0.42
	(0.072)	(0.072)	(0.072)	(0.072)	(0.072)	(0.072)
Proportion of "Other"						
Treatment 1	0.21	0.27	0.17	0.17	0.16	0.20
	(0.053)	(0.065)	(0.052)	(0.05)	(0.047)	(0.051)
Treatment 2	0.15	0.25	0.15	0.18	0.21	0.15
	(0.056)	(0.073)	(0.059)	(0.06)	(0.067)	(0.056)
Treatment 3	0.10	0.17	0.13	0.15	0.11	0.05
	(0.033)	(0.054)	(0.043)	(0.045)	(0.040)	(0.027)
Treatment 4	0.20	0.19	0.17	0.17	0.19	0.13
	(0.055)	(0.057)	(0.052)	(0.050)	(0.053)	(0.046)

Note: Standard errors in parentheses.

Table 8: Proportions of First Possible Moment Plays

	Number of Possible Volunteers					
	2	3	4	5	6	7
Treatment 1	0.29	0.23	0.19	0.22	0.19	0.21
	(0.063)	(0.061)	(0.055)	(0.057)	(0.051)	(0.055)
Treatment 2	0.46	0.31	0.28	0.40	0.32	0.36
	(0.081)	(0.078)	(0.073)	(0.077)	(0.078)	(0.071)
Treatment 3	0.24	0.10	0.13	0.15	0.09	0.17
	(0.056)	(0.045)	(0.046)	(0.049)	(0.041)	(0.048)
Treatment 4	0.25	0.13	0.18	0.17	0.20	0.17
	(0.061)	(0.048)	(0.053)	(0.048)	(0.055)	(0.048)

Note: Standard errors in parentheses.

B Experimental Details

This experiment was conducted at the University of California, Santa Barbara Experimental and Behavior Economics Laboratory using ZTREE (Fischbacher, 2007). Subjects were recruited using the Online Recruitment System for Economic Experiments (Greiner, 2004). A total of 180 subjects participated in the experiment. 48 subjects participated in each treatment with the exception of the inexpensive contribution treatment with recognition (36 subjects). Each session of the experiment lasted about 45 minutes and included 12 subjects. Gender composition was controlled as closely as possible via recruiting. Subjects earned an average of $14 which includes a $5 show-up fee.

Each session consists of 13 rounds-with one being randomly chosen to determine payment. The assignments of subjects to groups are designed so that each subject participates in ten rounds in which they receive the $10 bonus and at least once in a group of each size $(n = 1-7)$. Subjects are not matched with the same group twice. Though these assignments are not random, they are unpredictable and effectively random from the subjects point-of-view.

Subjects must wait through the entire 30 second window regardless of their choices. They cannot rush through the experiment by volunteering quickly. After the 30 seconds, each is asked a followup question. Anyone choosing to volunteer is asked whether they would prefer the $x be taken from them or from someone else in the event that they tied for the earliest volunteer time. Non-volunteers are asked whether they would prefer to switch their decision in the event that all other group members also refuse to volunteer.

During the course of the experiment, subjects are not shown the outcomes of previous rounds. However, at the end of the experiment, they are shown the outcome of the round chosen as the paying round.

Once the 13 rounds end, subjects learn the outcome of the paying round, fill out a short demographic questionnaire and are given cash payments in sealed envelopes.

XI For Online Publication

A Screen Shots and Instructions

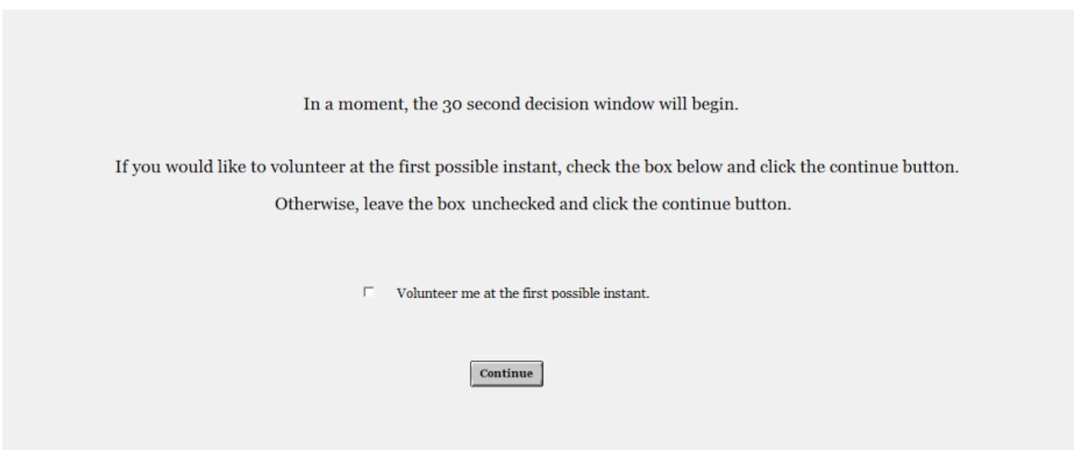

Figure 8: First Possible Moment Decision Screen

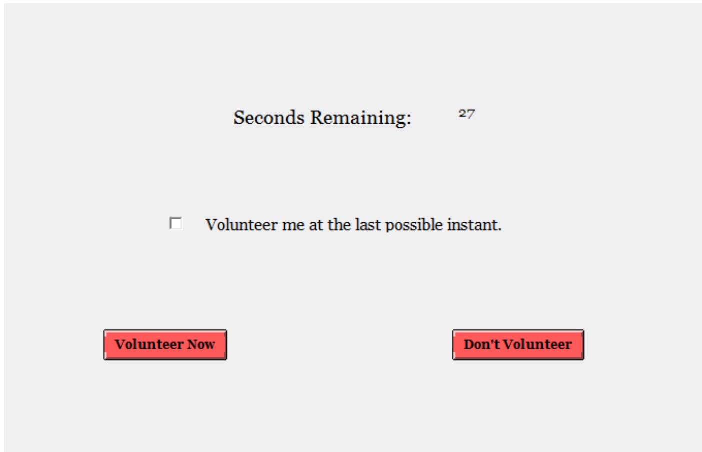

Figure 9: Main Decision Screen

Experiment Instructions

This experiment has 13 rounds. In each round, you will be assigned to a group. All members of your group, except one, will be given a payment of $10. One group member, whom we will call "Person X", will be given $0.

Please click below to continue...

If anyone in your group offers to give up $x to help Person X, then Person X will receive a payment of $10-$x. Only one volunteer is needed. If more than one person volunteers, we will select the first person to do so.

Each person has 30 seconds in which to volunteer. An on-screen clock will show how much time remains. This part of each round will take 30 seconds regardless of the choices made by everyone in your group.

If you initially received $10, and you are willing to contribute the $x, you must click the "volunteer" button before time runs out. If you don't want to volunteer, simply wait until the 30 seconds have elapsed or click the "Don't Volunteer" button.

Click below to continue...

-- If just one of the people who initially received $10 volunteers, that person pays $x, the others pay nothing, and Person X gets $10-$x.

-- If more than one of the people who initially received $10 volunteer, then Person X will get $10-$x and the person who volunteered first will pay $x. (If two or more volunteer at the same time, one person will be chosen at random to pay $x.)

-- If no one offers to contribute, then no one will have to pay, and Person X will get $0.

Click below to continue...

In each new round, you will be assigned to a new group, possibly of different size.

At the end of the experiment, one of the <Rounds|0> rounds will be randomly chosen as the "paying" round. This is the only round of which you will be informed the outcome, and your experiment earnings will be determined, as described on the previous slides, from this round only.

There will be no other opportunities to earn money in this experiment. This means that if Person X receives $0 in the round that is chosen as the "paying" round, he or she will earn nothing in the experiment.

(Recognition Treatments Only)

Notice that each of you has an ID number on the back of your chair. At the end of the session, the id numbers of anyone who was chosen to give up the $x to help person X in the paying round will be announced to everyone in the room. ID numbers of those who volunteered but were not chosen to contribute or did not volunteer will not be announced.

Click below to continue...

To Summarize:

1. During this experiment, you will participate in <Rounds|0> rounds.

2. In each round, you will be matched with a different group.

3. In each round, everyone who initially received $10 will have 30 seconds to decide if they will volunteer to give up $x so that Person X can have $10-$x instead of $0.

4. If more than one person volunteers, the person who volunteered first will be chosen to pay the $x.

5. Only one of the <Rounds|0> rounds will be randomly chosen as the "paying" round. There will be no other opportunities to earn money in this experiment. This means that if Person X receives $0 in the round that is chosen as the "paying" round, he or she will earn nothing in the experiment.

(Recognition Treatments Only)

6. At the end of the experiment the ID numbers of anyone chosen to give up the $x in the paying round will be announced to everyone in the room.

Click below to continue...

Follow-Up Questions

You offered to spend $x to help Person X at the first possible instant. If it turns out someone else also offered to contribute at the first possible instant, would you prefer that we take the $x needed to help Person X from you?

You offered to spend $x to help Person X at the last possible instant. If it turns out that someone else also offered to contribute at the last possible instant, and no one offered earlier, would you prefer that we take the $x needed to help Person X from you?

You offered to spend $x to help Person X when there were <VolunteerTime|1> seconds remaining. If it turns out that someone else also offered to contribute at the same time, and no one offered earlier, would you prefer that we take the $x needed to help Person X from you?

You did not offer to spend $x to help Person X. If it turns out that the others also refused to help Person X, would you be willing to change your decision and spend $x to help Person X get $10-$x?