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Social image concerns and prosocial behavior: Field evidence from a nonlinear incentive scheme

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ABSTRACT

Using longitudinal data on the entire population of blood donors in an Italian town, we examine how donors respond to a nonlinear award scheme that rewards them with symbolic prizes (medals) when they reach certain donation quotas. Our results indicate that donors significantly increase the frequency of their donations immediately before reaching the thresholds for which the rewards are given, but only if the prizes are publicly announced in the local newspaper and awarded in a public ceremony. The results are robust to several specifications, sample definitions, and controls for observable and unobservable heterogeneity. Our findings indicate that social image concerns are a primary motivator of prosocial behavior and that symbolic prizes are most effective as motivators when they are awarded publicly. We discuss the implications of our findings for policies aimed at incentivizing prosocial behavior.

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1. Introduction

Prosocial activities represent a substantial part of social life, including such actions as donating money for a cause or an organization, volunteering for a party during election times, cleaning beaches, or donating blood. The economic value of the resources devoted to volunteering or charitable giving is considerable. In the US, for example, charitable giving totals over $260 billion, or around 1.9 percent of personal income (Andreoni, 2007), and the estimated dollar value of volunteer time is over $240 billion (Independent Sector, 2006). Understanding what motivates individuals to contribute to prosocial causes emerges, therefore, as a topic of increasing interest in economics. The issue is made all the more pressing by the fact that, for many of these activities, supply is often below societal needs.

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Blood donations are a prominent example of the spread of altruistic activities on the one hand and of the insufficiency of the supply on the other.[1] Shortages are frequent in most western countries, and even more so in developing nations.[2] Blood transfusions are needed in critical situations, such as massive blood loss due to trauma, as well as during surgical interventions and to treat several chronic diseases; there is no substitute available for human blood. In addition, medical innovations, such as organ transplants and the aging of the population, are further increasing demand. Even though many individuals are eligible to donate blood and there are numerous awareness campaigns that promote its importance, only a small percentage of eligible individuals (between 5 percent and 10 percent) donate blood in the western world, and even fewer do so in developing countries. This holds for many other prosocial activities as well.

A factor that might increase the performance of prosocial activities concerns people's incentives. Individuals might simply not find it worthwhile to engage in prosocial activities if the benefits fall short of the opportunity costs. If this is the case, then explicit incentives might be effective in increasing the number and frequency of donations by the eligible population. To understand what kind of incentives might encourage prosocial behavior, however, one must first have an understanding of the motives behind altruistic behavior. In fact, recent empirical and theoretical contributions suggest that depending on what motivates individuals to contribute to prosocial causes, certain types of incentives might backfire. Deci (1975), for instance, found that providing pecuniary rewards for the performance of activities that are originally motivated by intrinsic reasons leads to a reduction in the performance of those activities. More recently, similar findings have been obtained by, among others, Frey and Oberholzer-Gee (1997), Gneezy and Rustichini (2000), Mellstrom and Johannesson (2008), and Ariely et al. (2008). A few findings indicate a positive impact of material, non-cash incentives. Goette and Stutzer (2008) find that blood donors are attracted by the possibility of participating in a lottery at a drive. Furthermore, Lacetera and Macis (2008) find that the legislative provision that guarantees a paid day off work to Italian blood donors does lead to an increase in donation frequency.

Other types of extrinsic incentives, however, could increase the motivations to perform prosocial activities in an equally if not more effective way than more "material" forms of payment. For example Frey and Neckermann (2008) argue that, unlike explicit payments, symbolic awards may be less costly, create a special relationship between the awarding and awarded parties, and increase the self-esteem, "warm glow", social status, and social recognition of the receiver; in contrast, rewards with an immediate monetary value can instead send a "bad signal" (to society and to one's own self) about the real motives behind the performance of a given activity (Bénabou and Tirole, 2006).[3] If this is true, then symbolic awards could emerge as both effective and efficient means to encourage prosocial behavior.

In this paper, we assess the impact of symbolic rewards on the performance of prosocial activities. We investigate, first, whether individuals care about receiving symbolic awards and, second, whether they do so because of the social recognition attached to them. To answer these questions, we analyze the effects of a nonlinear, symbolic award scheme put in place by the Italian Association of Voluntary Blood Donors (AVIS). The Association gives symbolic awards (medals) when a donor reaches certain donation quotas. One crucial feature of this scheme is that some of the prizes are assigned privately, whereas others are awarded in a public ceremony, with the names of the recipients published in the Association's bulletin and in the local newspaper. These peculiar features of AVIS's award scheme provide us with a unique opportunity to understand what characteristics of the awards actually affect donors' behaviors, thereby shedding light on the real motivations behind blood donation and altruistic behavior in general. The logic behind our analysis follows the small but growing literature that exploits nonlinear incentive schemes to investigate alternative motivations behind observed behavior (Asch, 1990; Meer and Rosen, 2009; Oettinger, 2002; Oyer, 1998). If donors' only motives are "pure" altruism or "warm glow" (Andreoni, 1989, 1990), their donation patterns should not change in response to the award scheme. If donors, however, place importance on the symbolic awards, then we should expect their donation patterns to be influenced by the incentive scheme. In particular, the fact that two different types of medals are awarded allows us to evaluate whether donors care about the award *per se* or whether, instead, what matters is the public recognition. If donors respond to any awards because they value being recognized by the Association, then they should respond to the award scheme, but we should not observe any difference in the response to privately and publicly assigned awards. However, if donors are attracted by the increase in social prestige that may be derived from their altruistic activity being publicly recognized, then donors' responses should be more pronounced in correspondence to the public awards.

Our study is based on a unique, hand-collected, longitudinal dataset comprising the whole individual histories of blood donations of the entire population of donors in a mid-sized Italian town ("The Town" hereinafter) between 2002 and 2006.[4] The analysis shows that blood donors react to the symbolic award incentives by increasing their donation frequency as the

[1] The website *BloodBook.com* reports that more than 16 million units of blood are annually collected in the United States. The Italian Association of Blood Donors (Associazione Volontari Italiani del Sangue: AVIS) collected about 2 million units of blood in 2006 (AVIS, 2007), and 44 percent of the French declare to have donated blood at least once (Healy, 2006).

[2] In the US, the American Red Cross and other organizations that collect blood are supposed to have, at each point in time, the blood necessary for three days of demand at each location and for each blood type, but this target is seldom met, especially for rare blood types (including 0 negative, which is the universal donor and therefore particularly precious). Moreover, it is estimated that worldwide, there is currently a shortage of about 22 million units of blood (Hemobiotech, 2008).

[3] Ellingsen and Johannesson (2007) offer a survey of studies on the role of symbolic rewards.

[4] To protect the privacy of the donors in our database, we have agreed to keep the name of The Town (as well as any other identifying information) confidential.

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donation threshold to receive one of the awards approaches. The change in behavior, however, is substantial in magnitude and statistically significant only in proximity to those prizes that are publicly awarded. The reduction in the lag between two donations when the "public award" approaches is as high as about 30 percent just before the threshold is reached, after which donation frequency returns to baseline. We interpret this finding as indicating that donors care about the social prestige that is associated with their altruism being publicly recognized. Our interpretation of the results is strengthened by the finding that the acceleration in donation frequency is stronger when the donation that corresponds to a public award occurs in the month immediately before the award ceremony.

The findings in this paper are consistent with a number of economic theories and anecdotal evidence on the role of social prestige concerns for the performance of prosocial activities and the provision of public goods.[5] Systematic empirical evidence on the impact of social image concerns is scant, however. Notable exceptions are represented by a few experimental studies. Ariely et al. (2008) find that their subjects would type faster on a keyboard or cycle faster on a stationary bike when these activities are associated with donations to "good causes" and the subjects' performance is publicized. Andreoni and Bernheim (2009) find that the preference for fairness shown by subjects in certain games may be due to social image concerns. Neckermann and Frey (2007), in a corporate setting, document that awards given to workers who contribute to a public good are more effective – in terms of the expressed intention of the subjects to contribute to the public good – when the awardees are made public.

In addition to providing novel findings from new sources of data, our study makes a number of methodological contributions and complements the existing experimental literature on the impact of explicit incentives on the performance of prosocial activities. To the best of our knowledge, our study is the first to analyze the actual behavior of an entire (and therefore representative) population of blood donors in response to a *naturally occurring* reward scheme. The fact that the incentive is naturally occurring attenuates some recently expressed concerns about social desirability bias in the experimental literature (Levitt and List, 2007). Finally, the longitudinal nature of our data makes it possible to observe the same individuals multiple times, thus allowing us to control for observable and unobservable individual heterogeneity.

The remainder of the paper is structured as follows. Section 2 describes the institutional context of this study and the particular award scheme of interest. Section 3 describes the data and outlines our hypotheses and empirical strategy. The empirical findings are reported in Section 4, and Section 5 offers a discussion and concluding remarks.

2. Blood donation in Italy and in The Town

The data used in this study originate from hand-collected information on the blood donation histories of all donors in an Italian town ("The Town" hereinafter) located in the Center-North part of the country.[6] Before describing the data in detail, we report on the blood donation system in Italy and in The Town.

Blood donation in Italy is organized through blood banks, which are run by voluntary donor associations. These associations have a central headquarter as well as town-level units. To donate blood, an individual is required to become a member of one of these associations. The three major associations, which are present in different parts of the country and do not compete with one another, are *Associazione Volontari Italiani del Sangue* (AVIS), with about 1.1 million members in 2007, *Federazione Italiana delle Associazioni Donatori di Sangue* (FIDAS), with about 400,000 members (Caligaris, 2007), and *Fratres* (150,000 members in 2000).[7] Because donors are affiliated with a local unit of the national associations, blood donors predominantly donate in the town where "their" unit is located. In The Town, blood donation is managed by the largest blood donor association, AVIS, and donations of either whole blood or blood components (plasma, platelets) are performed at The Town's public hospital, Monday through Saturday from 8 to 11 a.m. Donors do not make appointments, and they typically donate on a "first come, first served" basis.

The Italian law sets limits to the frequency of donations of blood and blood components. Whole blood can be collected once every 90 days from male donors and once every 180 days from females. Donors can give platelets once every 30 days and plasma once every 14 days. The time required for a platelet or plasma donation is about 1 h, compared to an average of 20 min for a donation of whole blood. Including the time to reach the donation site, the waiting time before the donation

[5] See, for example, Andreoni and Bernheim (2009), Bénabou and Tirole (2006), Ellingsen and Johannesson (2008), Harbaugh (1998a, 1998b), and Polborn (2007). Scholars in other disciplines have advanced similar claims (Goode, 1978; Nowak and Sigmund, 2000; Price, 2003; Wedekind, 1998).

[6] The demographic, social, and economic characteristics of The Town's population are highly representative of the overall Italian urban population. Statistics that compare the Town to other Italian towns under a number of socio-economic characteristics are available upon request.

[7] Blood donations run through blood banks and voluntary donor associations (which have been present since the 1920s) have become the official blood donation and collection system in Italy, after a brief period, following the end of World War II, when the Red Cross played a prominent role. Similar blood bank systems exist in other countries, such as Denmark, Greece, Norway, Portugal, and Spain. In the UK, France, and Ireland, in contrast, the organization of blood donation is run by the state. The Red Cross, finally, is the dominant organization that manages blood donation in such countries as Belgium, The Netherlands, Germany, and the US. In the US, however, the system is more heterogeneous and competitive, comprising the Red Cross, blood banks, and hospitals directly managing blood donations. See Healy (2006) on the different organizational modes of blood donations.

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Table 1
Awards, donation thresholds, and frequency of awards in The Town.

Award	Required accumulated donations	All donors		Males		Males, whole blood only	
		N	Percent	*N*	Percent	*N*	Percent
"Merit certificate"	8	394	2.75	286	2.56	121	2.48
"Bronze medal"	16	290	2.02	213	1.91	105	2.15
"Silver medal"	24	207	1.44	160	1.43	79	1.62
Total "private" awards		891	6.21	659	5.90	305	6.25
"Golden medal"	50	67	0.47	61	0.55	24	0.49
"Golden pin"	75	38	0.26	35	0.31	11	0.23
"Golden cross"	100	21	0.15	21	0.19	9	0.18
Total "public" awards		126	0.88	117	1.05	44	0.90
Total awards		1017	7.12	763	6.98	763	6.98
Total donations (2002–2006)		14,351	100	11,165	100	10,926	100
Unique donors (2002–2006)		2009		1425		856	

Notes: Data are for the period 2002–2006. The category "males, whole blood only" includes only male donors who always donate whole blood.

and the resting time at the hospital after the donation (which is longer for whole-blood donation), on average, a blood donor should expect a commitment of about 2 h.

2.1. Rewarding and recognizing donors through symbolic awards

AVIS has established a series of symbolic awards for frequent donors, as a way to express gratitude for their activity and, presumably, to motivate all donors to continue donating in a regular fashion. When a donor reaches certain thresholds in terms of number of donations, (s)he is awarded with such prizes as diplomas, medals, and pins. The thresholds to receive the various awards are fixed at 8, 16, 24, 50, 75, and 100 donations since joining the Association. Donations of whole blood, plasma or other blood products all count equally toward the awards. Furthermore, the recipients of the awards associated with the 8th, 16th, and 24th are notified and awarded "privately" (i.e., they pick up their medals at the Association's local office); when a donor reaches the 50th, 75th, and 100th donation, instead, (s)he is rewarded in a public ceremony held once every two years, and his/her name is published in the local newspapers and in the Association's bulletin. Table 1 presents the awards, the accumulated donations required to win them, and the fraction of donations corresponding to awards in the years 2002–2006.

Fig. 1 shows an article from a local newspaper that reports on the latest award ceremony, and Fig. 2 displays an actual AVIS membership card. The AVIS membership card reports the date and type of each donation made by the donor, which allows donors (and the Association) to verify whether the required interval between donations has been met, and to keep precise records of the cumulative number of donations made to date.


LA CELEBRAZIONE

L'ex presidente della sezione [redacted] apre l'elenco di coloro che hanno ricevuto il riconoscimento

Premiati i soci Avis, il record con 186 donazioni

[redacted] - Il riconoscimento, pur prezioso è simbolico, evidenzia una vita in cui l'impegno nel settore del volontariato è stato predominante, quasi che la solidarietà verso il prossimo fosse una costante di comportamento.

L'Avis di [redacted] ha premiato nei giorni scorsi i donatori di sangue che hanno raggiunto un numero significativo di donazioni. E' stata una cerimonia, a cui hanno partecipato le autorità cittadine, ma soprattutto i soci, in cui si sono evidenziate le necessità di sangue, sempre più difficili da soddisfare nella loro interezza e le risposte che la sezione di [redacted] la prima della provincia per donazioni effettuate, del tutto gratuitamente è riuscita a dare.

Per questo è stato numeroso il gruppo di donatori che ha ricevuto il rispettivo riconoscimento. Coloro che hanno raggiunto le 50 donazioni sono stati 38. Hanno ricevuto il distintivo [redacted]

[redacted] 18 soci che hanno raggiunto 75 donazioni. Hanno ricevuto il distintivo d'oro con un piccolo [redacted]

[redacted]. Altri cinque donatori hanno raggiunto o superato le 100 donazioni, ricevendo così un piccolo smeraldo, incastonato [redacted]

[redacted] sono i donatori che hanno ricevuto con un numero più alto di donazioni il distintivo [redacted] mante: l' [redacted] con 124. Si tratta di veri e propri record che dimostrano la costanza e l'attaccamento ai fini associativi di tante persone che hanno iniziato la loro attività di volontariato in giovane età. E proprio verso i giovani si indirizza l'azione promozionale dell'Avis [redacted] particolarmente presente nel mondo dello sport e in quello della scuola.

m.f.

Fig. 1. Article from a local newspaper where AVIS donors who reached the donation milestones are mentioned. Notes: Article from a local newspaper in The Town reporting the names of all donors awarded for reaching 50, 75, and 100 donations, on occasion of the biannual ceremony of the local AVIS Chapter. The name of the town and the names of the donors have been concealed for confidentiality reasons.

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Fig. 2. Sample AVIS membership card. Notes: The donor's personal information and any possible identifying details have been concealed for confidentiality reasons.

3. Data, hypotheses, and research design

3.1. Data

Using both AVIS's and the hospital's archives, we identified all of the Association's members from 2002 to 2006, and obtained their entire donation history (of whole blood or blood components) over this period and the total number of past donations (as of 12/31/2001). We were able to record a number of individual variables over time. Information included sex, age, blood type, and the date when each individual became an AVIS member and, therefore, began to donate blood.

Table 2
Descriptive statistics on donors and donations in The Town.

Variable	Mean	St. Dev.	Min.	Median	Max.	Obs.
Donors						
Fraction female	0.29					2009
Age	37.45	10.84	18	37	65	2009
Years in the sample	3.20	1.54	1	3	5	2009
Donations in the period 2002–2006						
All donors	7.14	6.01	1	6	47	2009
Males	7.84	6.38	1	6	47	1425
Females	5.46	4.60	1	4	31	584
Average number of donations per year						
All donors	2.23	1.40	1	2	12	6422
Males	2.33	1.44	1	2	12	4783
Females	1.94	1.22	1	2	9	1639
Information as of 12/31/01:						
Years active (all donors)	5.13	7.29	0	2	38	1937
Past donations (all donors)	13.29	20.92	0	4	145	2009
Years active (donors active as of 12/31/01)	9.07	7.63	1	7	38	1095
Past donations (donors active as of 12/31/01)	22.17	23.46	0	14	145	1167
Donations						
Fraction female	0.22					14,351
Fraction plasma/platelets	0.33					14,351
Age of donor	40.33	10.64	18	40	65	14,220
Days between consecutive donations	157.85	141.81	4	119	1749	12,342

Notes: Data are for the period 2002–2006.

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Table 2 presents descriptive statistics on the donors. Over the five-year period covered by our data, 2009 unique individuals donated blood in The Town, about 30 percent of whom were females. More than 14 thousand donations were made in the period 2002–2006. The median donor was 37 years old and made 6 donations in the sample period. Of the donors who were already active as of 12/31/2001, half had been members of the Association for at least 7 years and made at least 14 donations before 2002. Our data allow us to sort the donations of each individual and to compute the elapsed time (in days) between consecutive donations, which will be our key dependent variable.

3.2. Hypotheses and research design

Our approach is to exploit the nonlinearity of the symbolic award scheme put in place by AVIS, as described above, in order to ascertain whether social image concerns motivate blood donors. Nonlinear award schemes have been successfully exploited in other contexts, not just to evaluate whether individuals respond to incentives (Asch, 1990; Oyer, 1998), but also to distinguish between alternative motivations behind individuals' actions. Oettinger (2002), for instance, finds that students who are closer to a grade boundary before an exam perform better, controlling for pre-exam performance. He interprets his findings as evidence that students are "grade motivated" rather than purely "learning motivated": if they were just "learning motivated," their level of effort would not change depending on whether they are far from or near to one of the grade boundaries. In the context of charitable giving, Meer and Rosen (2009) detect "selfish" (as opposed to purely altruistic) considerations in donations of alumni by observing that donations increase as the alumni's children approach college age, and especially so when their children actually apply to their parents' *alma mater*.

In our setting, suppose that a donor i is intrinsically motivated to donate, but, potentially, is also responsive to the presence of rewards. There are two types of rewards, which depend on the particular number of donations n made: "private rewards" and "public rewards." The difference between these two rewards is that the community is informed about the assignment of public rewards, but not of private rewards. These rewards define a nonlinear incentive scheme because they are conferred only if some thresholds are reached. Call the intrinsic benefit from a donation B. This might include "pure" altruism (i.e., utility derived from the fact that others are benefiting), and "warm glow" (i.e., utility derived from the act of donating, independent of the benefit caused to others) (Andreoni, 1989, 1990), or both.[8] Next, define a variable r equal to 1 if a private reward is associated with a donation and 0 otherwise, and a variable R equal to 0 if a public reward is associated with a donation and 0 otherwise. Donating blood entails a cost c. In a given day, and given the number of past donations made, the utility a donor i enjoys from the nth donation can be expressed as $U_{i,n}(B_{i,n},\ r_n,\ R_n,\ c_{i,n})$. For simplicity, assume that the utility function assumes a linear form as follows: $U_{i,n} = B_{i,n} + \pi_{i,n} r_n + \Pi_{i,n} R_n - c_{i,n}$, where π and Π are parameters indicating the response to the presence of private or public rewards, and all variables are individual-specific and also indexed by the number of donations already made. A donor decides to donate if $B_{i,n} + \pi_{i,n} r_n + \Pi_{i,n} R_n \geq c_{i,n}$, If donors are motivated by only "pure" altruism or "warm glow," the pattern of their donations should not be systematically related, *ceteris paribus*, to whether a given donation is associated with an award. Equivalently, π and Π would be zero, and the probability that a donation is made in a given day, would not depend on the presence of a reward associated with making that donation. If donors, however, do place importance on the symbolic awards, then we should expect their donation patterns to be influenced by the incentive scheme. More specifically, the fact that two different types of medals are awarded allows us to evaluate whether donors care about the award per se or whether, instead, what matters is the public recognition. If donors respond to any awards because they value being recognized by the Association, then we should not observe any difference in the response to privately and publicly assigned awards. If this were the case, then the parameters π and Π would have similar (positive) values. Therefore, in a given day and for a given number of donations made $n-1$, the probability that $U_{i,n} \geq 0$ would be greater if $r = 1$ or $R = 1$ at donation n (i.e., if either a private or public reward is associated with donation n). As a consequence, the expected lag between donation $n-1$ and donation n would be shorter if a reward were to be obtained by making the nth donation. If, however, donors are attracted by the increase in social prestige deriving from reaching a certain donation quota, then donors' responses should be more pronounced in correspondence to the public awards. We will have $\Pi > \pi$, and the expected time lapsed between two consecutive donations would be shorter when $R_n = 1$ than when $r_n = 1$.

Indexing the variables of this simple model by the individual donor and the number of donations is particularly important. Observable characteristics such as sex, age, the number of past donations, and the type of donations an individual performs – whole blood, plasma, or platelets – because the required minimum amount of time between the previous donation and the current one varies with the type of the current donation[9] – might be associated with donation frequency. Perhaps more fundamentally, individuals might differ in their unobservable donation attitudes.

[8] In other words, we assume, realistically, and consistent with the altruism literature, that donors are motivated to donate also in the absence of explicit rewards, and these various motivations are summarized in B.

[9] Conversations with doctors and AVIS officials in The Town revealed that the type of donation is "exogenous" to a donor's choice. Donors, in general, join the Association to donate whole blood, and are assigned to donating blood components if they are not eligible to donate whole blood (e.g., if they have insufficient iron in their blood), or if there is some urgent need for a blood component. As a consequence, it is highly implausible that donors shift types of donations toward more "frequent ones" (e.g., shift from whole blood to platelets) as the awards thresholds approach.

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Table 3
Elapsed time between consecutive donations: descriptive statistics.

	No award	"Private" award	"Public" award
Whole sample			
Mean	157.9	164.6	109.5
Median	119	129	98
St. Dev.	142.9	131.7	76.2
No. of obs.	11,428	796	118
Males			
Mean	151.4	158.5	103.5
Median	116	126	98
St. Dev.	134.2	126.0	71.5
No. of obs.	9036	595	109
Males, whole blood only, adjusted[a]			
Mean	100.3	105.8	48.1
Median	51	58	29
St. Dev.	152.2	146.2	70.2
No. of obs.	3724	265	39

Notes: The table reports statistics on the number of days between consecutive donations ($n-1$ and n) for the cases in which donation n does not correspond to any medal ("no award"), donation n corresponds to privately awarded medals ("private" awards), and donation n corresponds to publicly awarded medals ("public" awards).

[a] For the subsample of males who only donate whole blood, we report statistics on the "excess" interval (i.e., the days between consecutive donations − 90, where 90 is the minimum required number of days between donations).

For example, donors with many donations – and therefore more likely to be crossing one of the "reward thresholds," and, in particular, the "public" ones – might have a long "donor tenure" because of intrinsic, unobservable characteristics (e.g., their sheer generosity), which make them prefer to donate more frequently. This possibility would represent a serious identification concern if we only had cross-sectional data. In a cross-section, in fact, observing a reduction in the elapsed time between donations when donors are closer to the public award thresholds might just occur because the donors who actually reach a higher number of donations are those with unobservable characteristics that make them donate more frequently. However, the longitudinal nature of our data allows us to control for this potential unobservable heterogeneity, to the extent that, of course, these unobservables are time-invariant within individuals. In particular, we can implement an individual fixed-effects econometric design (in addition to controlling for a number of observable characteristics), which partials out any remaining heterogeneity that might make our findings spurious.

4. Empirical analysis

4.1. Awards' visibility and donation lags: descriptive evidence

Table 3 reports information on the elapsed time between consecutive donations. Overall, the average and median intervals were 158 and 119 days, respectively. As noted above, donors are required by law to wait at least 90 days (for males, or 180 for females) between two whole-blood donations, 30 days for platelets and 14 days for plasma. The second panel of Table 3 reports statistics for male donors only, and the third panel shows information about male donors who always donate whole blood. For donations of whole blood by male donors, the average and median intervals are equal to 190 and 141 days, respectively. Both in the whole sample and in the more homogenous subsample of donations of whole blood by male donors,[10] average and median lags immediately before a donation that would result in being granted a private reward (7th–8th, 15th–16th, and 23rd–24th) are quite similar to the overall values. In contrast, the elapsed times for the donations leading to the public awards (49th–50th, 74th–75th, and 99th–100th) are sizably shorter; average and median spells are 109 and 98 days for all types of donations, and 138 and 119 for the donations of whole blood by male donors. Since the minimum lag between two whole-blood donations is 90 days, the average reduction in the "effective" time elapsed between donations of whole blood is from 100 days (i.e., 190–90) to 48 (i.e., 138–90) – a 50 percent reduction.

Fig. 3 shows the entire distributions (c.d.f.) of elapsed days between consecutive donations for donations corresponding to no award, donations leading to a private award, and donations leading to publicly recognized awards. In Fig. 4, we repeat the same exercise while isolating male whole-blood donors and reporting the distributions of "excess" lags (i.e., elapsed days − the 90 days required by law). While the distributions of the no award and the private-award lags do not appear to be too different from one another, the distribution of the public-award intervals is ostensibly shifted to the left. Kolmogorov-Smirnov tests of the equality of the distributions confirm this impression; in fact, the hypothesis that the distribution of

[10] See Section 4.2.1 for more motivations behind the restriction to this subsample for additional analyses.

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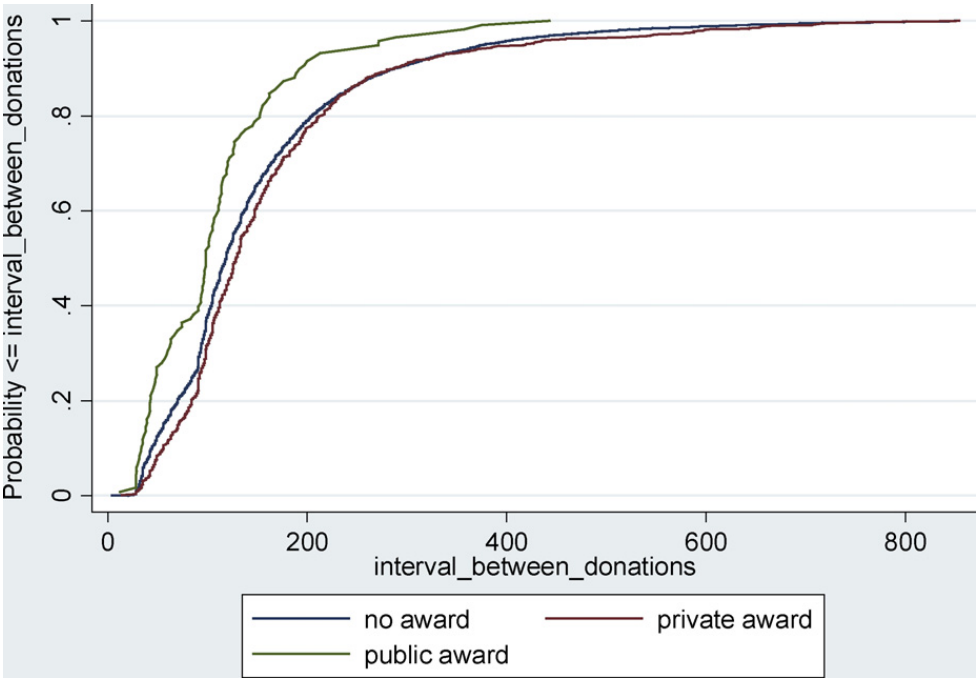

Fig. 3. Distribution of elapsed time between consecutive donations. Notes: The elapsed time between consecutive donations is measured in days. The figure shows the distributions separately for donations leading to no award, donations leading to a private award, and donations leading to a publicly recognized award.

the public-award lags is equal to that of the no award lags can be rejected at the 2 percent significance level, while the distributions of the no award and the private-award lags differ from each other only marginally.

Although the descriptive evidence we presented is strongly suggestive of an effect of publicly awarded prizes on donation frequencies, it might be the case, as discussed above, that the differences are driven by observable donor characteristics, or unobservable heterogeneity. In the next sections, we assess whether these results are robust to regression analyses.

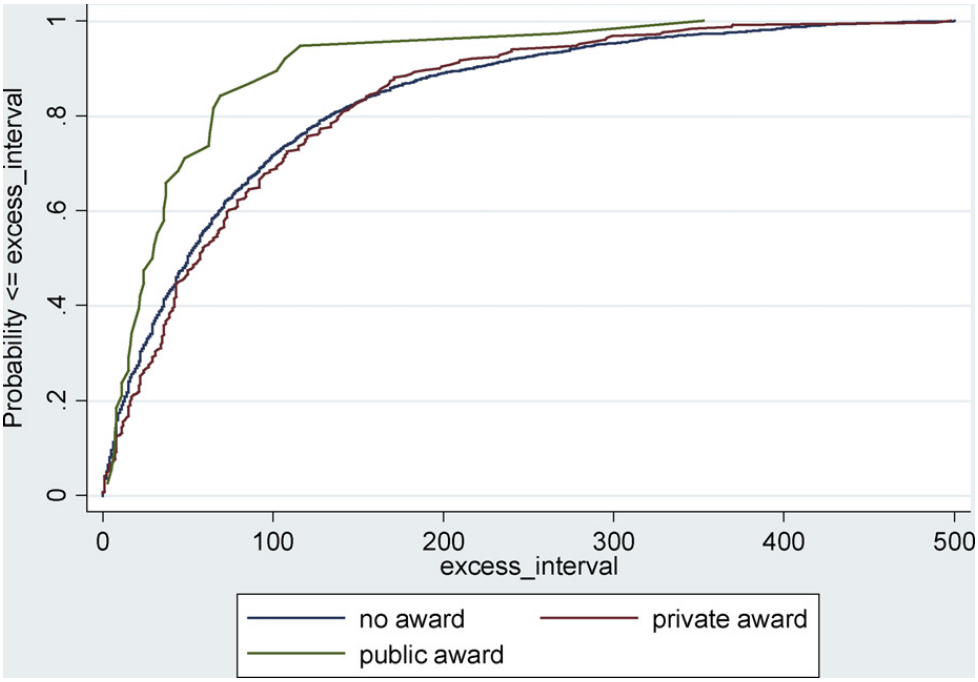

Fig. 4. Distribution of elapsed time between consecutive donations in excess of 90 days, for male, whole-blood donors. Notes: The figure shows the distribution of elapsed time (measured in days) in excess of 90 days (the minimum interval required by law for male whole-blood donors), for male, whole-blood donors only.

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Table 4
Awards and frequency of donation: regression results.

	Dependent variable: days between consecutive donations		
	Ordinary least squares		Fixed effects
	(1)	(2)	(3)
Private award[a]	−3.04	−15.82***	−9.78*
	(5.91)	(5.75)	(5.04)
Public award[b]	−42.89***	−46.33***	−26.60***
	(9.22)	(10.06)	(8.04)
Female	49.41***	32.65***	
	(5.20)	(4.79)	
Age 30–39	−1.80	−6.69	−15.00*
	(5.82)	(5.22)	(8.49)
Age 40–49	−15.56***	−8.38	−15.07
	(5.85)	(5.46)	(12.24)
Age 50+	−26.51***	−15.70**	−24.84*
	(6.00)	(6.35)	(14.97)
Plasma/platelets[c]	−79.29***	−58.56***	−36.60***
	(3.38)	(3.11)	(2.93)
Number of past donations		−3.14***	−10.23***
		(0.30)	(1.05)
Donation > 50[d]		52.36***	18.75**
		(8.78)	(9.06)
Constant	126.3***	585.8***	321.1***
	(6.21)	(32.85)	(22.83)
Wald test for public = private (Prob > *F*)	0.00	0.01	0.08
Year fixed effects	Yes	Yes	Yes
Cohort fixed effects	No	Yes	–
Individual fixed effects	No	No	Yes
Observations	12,289	12,287	12,287
R^2	0.11	0.19	0.10
Number of donors (FE)			1725

Notes: The dependent variable is the number of days between consecutive donations. Standard errors (in parentheses) are, in all cases, clustered by individual donor.

[a] Private Award is an indicator variable equal to 1 if the corresponding donation is the 8th, 16th, or 24th (i.e., donations are associated with a privately awarded prize).

[b] Public Award is an indicator variable equal to 1 if the corresponding donation is the 50th, 75th, or the 100th (i.e., donations are associated with a publicly awarded prize).

[c] Plasma/platelets is an indicator variable equal to 1 if a given donation is of plasma or platelets and 0 if it is of whole blood.

[d] Donation>50 is an indicator variable equal to 1 for donations from the 50th up.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

4.2. Awards' visibility and donation lags: regression analysis

Following the discussion in Section 3 above, our regression analyses will estimate various specifications of the following empirical model:

$$Elaps_{i,n,m,t} = \alpha + \beta_1 Award_{i,n}^{Private} + \beta_2 Award_{i,n}^{Public} + \beta_3 Z_{i,t} + \gamma_t + \mu_m + \delta_i + \varepsilon_{i,n,m,t}. \quad (1)$$

In Model (1), $Elaps_{i,n,m,t}$ is the elapsed time (in days) between individual i's $n-1$th and nth donations, $Award_{i,n}^{Private}$ is a dummy variable equal to 1 if donation n is the 8th, 16th, or 24th donation and zero otherwise, $Award_{i,n}^{Public}$ is a dummy variable equal to 1 if donation n is the 50th, 75th, or 100th donation and 0 otherwise, $Z_{i,t}$ is a vector of (possibly individual-specific and time-varying) control variables, γ_t and μ_m are vectors of year and month dummies respectively, and the error term is composed of an individual-specific component δ_i and a "white noise" $\varepsilon_{i,n,m,t}$. In all cases, we clustered the standard errors at the level of the individual donor, thus allowing for arbitrary heteroschedasticity and autocorrelation.

Table 4 reports the results of three specifications.[11] The main coefficients of interest are β_1 and, especially, β_2; they represent estimates of the changes in the donation lags that correspond to private and public rewards, respectively, as

[11] In the analyses reported here, the elapsed time between donations enters in levels. Regressions with the natural logarithm of $Elaps_{i,n,t}$ as the dependent variable (performed to assess the relative impacts and to make sure the results are not driven by outliers), not reported here, yield qualititively similar results in terms of both the signs of coefficients and their statistical significance.

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compared to any other donation. The estimates of these two parameters would inform us of the value of the parameters γ and δ in the donors' utility function described in the previous section.

Columns (1) and (2) report results from ordinary least squares regressions, and column (3) reports the coefficient estimates from fixed-effects regressions. In column (1), the specification includes, as controls, sex, age categories, year fixed effects, month fixed effects, and an indicator of whether a donation is of plasma or platelets.[12] The coefficient estimate on $Award^{Private}$ is negative but small and statistically insignificant whereas that on $Award^{Public}$ is negative, quite large in magnitude, and strongly statistically significant. In column (2), we include among the controls the number of past donations made by an individual, and a vector of "cohort" indicators (i.e., dummy variables for the year that each donor joined the association). We do so to control for heterogeneity across donors as well as to account for possible changes in donation patterns over time. We also include an indicator variable for donations above the 50th, to further control for the possibility that the "public award" dummies are just capturing a selection effect, with more frequent donors being those who let a shorter time pass between donations, regardless of the presence of awards. In column (3), finally, we estimate the same model as in column (2) with the addition of individual fixed effects. The OLS and fixed-effect regressions yield qualitatively similar results; the estimates on the public award dummy are attenuated, going from −46 to −27 in the fully specified models (2) and (3), but remain sizable and strongly statistically significant. The attenuation confirms the importance of accounting for individual observable as well as unobservable heterogeneity. Remarkably, the coefficient on the "public" award variable is always substantially (and significantly, as shown by *t*-tests whose *p*-values are reported at the bottom of Table 4) larger than that on the "private" award variable. In the fixed effects specification, the coefficient on the "private" awards dummy is only marginally significant whereas that on the "public" awards dummy remains sizable and strongly statistically significant. Overall, these results strongly confirm the descriptive evidence presented above, with donors substantially reducing the lag between consecutive donations, when the next donation is associated with public recognition.

Below we report a series of additional analyses that further investigate the nature of the drop in donation lags around the public award threshold, and to reinforce the identification of the impact of social image concerns on blood donation behavior.

4.2.1. Additional analyses and robustness tests

First, we assess whether the change in donation lags occurs only at the award thresholds (for example, between the 15th and 16th donation, or between the 49th and 50th donation) or whether donors, instead, progressively reduce their lag as they approach the symbolic award thresholds. We also investigate whether donors build a habit of more frequent donations, thus keeping lower lags in future donations right after they reach an award threshold. In column (1) of Table 5 we report, for convenience, the main estimated coefficients of interest from column (4) Table 4. Column (2) of Table 5 reports estimates from a regression similar to that of Table 4, column (4), with the difference that dummies for the two donations before, and the two donations after the donations that correspond to the symbolic awards have been added to the controls. The result of this exercise indicates that the main effect is focused on the "critical" donation; donors do not seem to form a habit, nor do they start reducing their lags beforehand.

Second, we exploit a further institutional feature of the social incentive scheme devised by AVIS in The Town; namely, the fact that the biennial ceremony at which the public awards are given and the names of the awardees are revealed takes place every other year in the month of February. In the period covered by our data, the ceremonies occurred in the month of February of the years 2002, 2004, and 2006. If donors reduce their donation lags in proximity to the public award thresholds because they care about social reputation, then one might see an additional "speeding up" of donations when the public ceremony approaches. In column (3) of Table 5, we run our fully specified fixed-effect regression, adding interaction terms for whether the *n*th donation is at a threshold, and whether it occurs during the month of the ceremony or one, two, three, or four months earlier. Our results suggest some "ceremony effect" albeit limited to the month when the ceremony is scheduled to take place. Our results indicate that the lag between donations is further reduced (from about −28 to about −61, and the difference is statistically significant at the 5 percent level of confidence) if the threshold donation falls in the month when the ceremony is supposed to take place. Donors, therefore, appear to be more eager to make the crucial donation as the ceremony approaches.

Third, in columns (1) and (2) of Table 6, we estimate a version of model (1) with a full set of controls, fixed effects, and with dummies for each single threshold as opposed to just distinguishing between the set of private and public awards. The sign of the estimated coefficients is in most cases negative, indicating a reduction in the lag between donations when the next donation is associated with an award, but only the coefficient on the dummy for the 50th donation is consistently negative, sizable, and (strongly) statistically significant. This is interesting because the 50th donation threshold is the first one to give public recognition, and this could explain why donors seem to be particularly responsive to it.

Finally, in columns (3) and (4) of Table 6, we report the results of analyses limited to two subsamples: all donations by male donors, and the donation of whole blood by male donors. Female blood donors are subject to some additional constraints

[12] Where appropriate, we also included interactions of the award dummies with the plasma/platelets dummy. We did so to account for the possibility that donors might switch to donating plasma/platelets when approaching the award thresholds. These estimated coefficients are not reported to save space, and because no discernible patterns were detected. This is not surprising, in light of the fact that, as explained in footnote 9, the choice of which blood products to donate is largely outside the donors' control.

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Table 5
Award and frequency of donation: distance to ceremony, leads and lags.

	Dependent variable: days between consecutive donations All donors, fixed effects		
	(1)	(2)	(3)
Two donations before private award		8.01	
		(5.78)	
One donation before private award		0.70	
		(5.79)	
Private award[a]	−9.78*	−8.88*	−9.83*
	(5.04)	(5.32)	(5.06)
One donation after private award		6.06	
		(6.56)	
Two donations after private award		−5.60	
		(5.33)	
Two donations before public award		−16.61*	
		(9.65)	
One donation before public award		2.45	
		(10.60)	
Public award[b]	−26.60***	−27.89***	−27.70***
	(8.04)	(8.50)	(9.09)
One donation after public award		6.34	
		(12.10)	
Two donations after public award		−13.85	
		(10.10)	
Public award × (month of ceremony)			−33.19**
			(15.60)
Public award × (one month before ceremony)			21.2
			(13.00)
Public award × (two months before ceremony)			−24.44
			(27.30)
Public award × (three months before ceremony)			18.36
			(29.50)
Public award × (four months before ceremony)			22.73
Year fixed effects	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes
Observations	12,287	12,287	12,287
R^2	0.10	0.10	0.10
Number of donors (FE)	1725	1725	1725

Notes: The dependent variable is the number of days between consecutive donations. Standard errors (in parentheses) are, in all cases, clustered by individual donor.

[a] Private award is an indicator variable equal to 1 if the corresponding donation is the 8th, 16th, or 24th (i.e., donations are associated with a privately awarded prize).

[b] Public award is an indicator variable equal to 1 if the corresponding donation is the 50th, 75th, or 100th (i.e., donations are associated with a publicly awarded prize). Controls include year effects, month effects, an indicator for whether the donation was of blood components (plasma or platelets), an interaction of the plasma/platelets dummy with each award dummy, age dummies (18–29, 30–39, 40–49, 50+), the number of past donations, and an indicator for donations above the 50th.

*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

that make it difficult for them to reach a higher number of donations in their tenure as active donors. In particular, they cannot donate blood more often than every 180 days (as opposed to 90 days for men), and cannot donate when pregnant and for a few months after giving birth. In our data, only 9 women reached at least 50 donations, only 3 had at least 75 donations, and no female donor has reached 100 donations. This small sample of women might not be representative; thus, we wanted to rule out the possibility that our results were driven by these outliers. Focusing on whole-blood donations also provided us with a more homogenous sample, and, moreover, it allows us to analyze the magnitudes of the estimates because we can refer the estimated number to the common, minimum period between two whole-blood donations (90 days). In column (4), to further address potential selection issues not fully addressed by donor fixed effects, we restrict the sample to only include male donors of whole blood who eventually reached at least 50 donations. Doing so considerably reduced the number of donors and observations, but affected neither the magnitude or the statistical significance of our coefficients of interest. Once we fully controlled for observables and unobservable, time-invariant characteristics, the reduction in the donation lags in proximity to the private awards was not significant (or only marginally significant) whereas the estimated reduction in the donation lag at the 50th award threshold was statistically significant with a magnitude of 26 (column 3) to 28 (column 4) days. Considering that the average whole-blood donation lag by male donors is 190 days and that the minimum legal lag is 90, the estimated actual reduction in whole-blood donation lags is about 30 percent – a substantial percentage.

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Table 6
Award and frequency of donation: regressions with dummies for each specific threshold.

	Dependent variable: days between consecutive donations Fixed effects			
	All donors (1)	Males (2)	Males, whole blood only (3)	Males, whole blood only, eventually reaching 50+ donations (4)
8th donation award	−11.47	−13.30	−18.21	
	(7.90)	(8.27)	(14.60)	
16th donation award	−5.33	−5.68	0.90	
	(10.00)	(9.93)	(15.00)	
24th donation award	−12.27*	−10.55	−6.33	
	(6.51)	(6.59)	(8.27)	
50th donation award	−38.69***	−31.74***	−26.12**	−28.28**
	(12.30)	(12.20)	(13.20)	(13.00)
75th donation award	−16.22	−10.18	13.52	8.80
	(14.00)	(14.60)	(22.30)	(23.40)
100th donation award	−5.57	−4.97	4.23	0.24
	(13.00)	(11.80)	(13.00)	(11.40)
Year fixed effects	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes
Observations	12,287	9719	4013	872
R^2	0.10	0.08	0.09	0.09
Number of donors (FE)	1725	1237	681	95

Notes: The dependent variable is the number of days between consecutive donations. Standard errors (in parentheses) are, in all cases, clustered by individual donor. Controls include year effects, month effects, an indicator for whether the donation was of blood components (plasma or platelets), an interaction of the plasma/platelets dummy with each award dummy (only in columns (1) and (2)), age dummies (18–29, 30–39, 40–49, 50+), the number of past donations, and an indicator for donations above the 50th.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

All in all, these additional exercises reinforce the main result of this paper that donors respond to social image concerns.

5. Concluding remarks

In this paper, we have documented that the performance of prosocial activities is responsive to the social prestige attached to these activities. Using longitudinal data from the entire population of blood donors in an Italian town, we have found that donors substantially accelerate their donation frequency as their "tenure" gets closer to donation thresholds at which the blood donors' Association (AVIS) confers symbolic awards, but this acceleration is concentrated right before the quotas for which the rewards are publicly announced. We interpret this finding as indicating that social image concerns are an important motivator of blood donation.

This paper contributes to the literature on the relationship between intrinsic and extrinsic incentives in the performance of prosocial activities and the contribution to public goods, by showing that extrinsic incentives without direct economic value might also increase these activities, especially if social recognition is attached to these rewards. The contribution to this literature is also methodological because we add evidence from a natural setting to the current evidence based on controlled lab and field experiments, and the longitudinal nature of the data allows to control for individual heterogeneity. Our study also contributes to a recent empirical literature on the behavioral effects of awards in general. As pointed out by Neckermann and Frey (2007), awards are broadly used in a variety of contexts, but have not been investigated by economists in depth. We document that, at least in the case of prosocial behavior, an important component of these awards is their publicity, which allows awardees to boost their social image. In addition, we contribute to the literature that exploits nonlinear incentive schemes to investigate alternative motivations behind observed behavior (Meer and Rosen, 2009; Oettinger, 2002).

By demonstrating the impact of social image concerns on the performance of an activity with major health and societal implications, this study also provides insights for charitable organizations as well as policymakers. In their decisions on how to incentivize and reward their contributors, charitable organizations should consider the positive response to public recognition as a potentially strong (and cost-effective) motivator. More research is needed, however, to precisely quantify the effect of an award scheme such as that used by AVIS in terms of attracting new donors and motivating them to donate regularly as well as establishing what is the "optimal" design of symbolic awards schemes. An "excessive" number of rewards (for example in terms of how often they are given to contributors and to how many contributors they are given) might dilute the social prestige attached to being publicly known as a frequent donor. The so-called "snob effect" that a number of studies have analyzed on the demand side for certain products (Leibenstein, 1950; Pesendorfer, 1995) might be present on the supply side also, especially for activities carrying a social image impact. A challenge for charities is, therefore, to devise the optimal structure, in terms of quantity and frequency, of public rewards for their contributors. A further mechanism through which public rewards might increase donations is by conveying information about the behavior of others (Shang and Croson,

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2009). In addition, having the organization disclose the information on donors' charitable behavior to the community can help in situations in which donors might be reluctant to disclose the information themselves, e.g., because boasting about one's altruism is viewed skeptically (Harbaugh and To, 2008). A final implication is for public policies aimed at stimulating the voluntary contributions of citizens to public goods. If individuals have private motives for contributing to public goods beyond "pure altruism" (Andreoni, 1990, 1993; Andreoni et al., 2007), then public contributions should not result in a net crowd out of private contributions. The quest for social prestige that we found as having a significant impact on prosocial behavior is one of these private motives; therefore, public interventions such as matching private contributions of subsidizing charitable organizations might indeed increase the provision of these public goods.

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