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The Effect of Information Provision on Voluntary Contributions to Public Goods: A Field Experiment on Blood Donation*

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When the provision of public goods requires contributions from individuals with different abilities, solicitation of efficient voluntary contributions from heterogeneous individuals becomes important. Blood banks are one such public resource. Blood banks perform a challenging task in ensuring a balanced supply of blood types to provide effective blood transfusion services. This study designs a field experiment in conjunction with a blood donation campaign to examine whether making potential donors aware of their potential contribution (the net marginal product of their donation) induces efficient individual donation behaviour. During the blood donation campaigns at the university, we conducted a field experiment with two treatments: one treatment with information regarding desired donor profiles for 400 ml whole blood donations and another treatment without such information. We find that the provision of information about desired donor profiles enhances the propensity of able donors to donate, whereas the information provision tends to depress the stated intention to donate.

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1 Introduction

Effective solicitation of voluntary contributions to public goods from people with different abilities is a challenging task. Heterogeneous ability can be beneficial if a sufficient number of pivotal agents agree to contribute to the public good. The efficient provision of public goods becomes more demanding when contributions from a number of individuals with different abilities are required. In this case, the efficient provision of public goods requires that the individuals' total willingness to pay for the public good equals the marginal cost of its provision and that the net marginal products of individual contributions are equalised among contributors.

The blood bank is one example of this type of a public good. On one hand, to provide effective blood transfusion services, each blood bank must maintain different blood products and components of various blood types in balanced proportions at all times. To this end, each blood bank must ensure a supply of various types of blood. Because certain components of blood are perishable or costly to transport, alignment of donation behaviour as closely as possible to real-time demand is important. On the other hand, efficient blood supply can be enhanced by motivating potential donors with desired profiles to go to donation points. This approach reduces the attrition rate (due to the body weight of donors, the proportion of blood cells and the quality of blood) and the costs to produce quality blood products (e.g., reduced waiting time of effective donors and the cost of the biochemical screening process). Consequently, one challenging task commonly faced by many blood banks is efficiently soliciting blood by effectively motivating potential donors.

Titmuss (1972) argues that the commercialised market for blood fails to balance the supply and demand of blood and blood products, deteriorates quality and increases waste. Although Titmuss' complete rejection of the blood market in the US may not be universally tenable, the supply of blood products in many parts of the world depends heavily on voluntary contributions from unpaid blood donors. Many

blood banks, such as regional blood transfusion centres in Japan, strive to match the supply of blood donation with demand within the region.

A substantial body of experimental literature examines voluntary contribution mechanisms in homogeneous groups (Ledyard 1995). In a standard linear voluntary contribution mechanism, group members receive an endowment from which they can invest in a group project with an outcome shared equally amongst all members. The marginal return for each member of an incremental contribution is the so-called marginal per capita return.

To date, only a small number of studies have examined heterogeneous groups in which members vary in their marginal per capita returns[1]. Fisher et.al. (1995) and Tan (2008) compare the contribution behaviours of members of heterogeneous groups consisting of individuals with high and low marginal per capita returns to the behaviours of homogeneous groups. Within heterogeneous groups, both studies find that individuals whose contributions have higher marginal returns to the public good tend to have a higher propensity to contribute than members with lower marginal returns. These results seem to suggest the prevalence of contribution behaviour in accordance with efficiency concerns. Fellner et. al. (2010) examine underlying motives for contributions using an experimental design that controls for the opportunity cost of individual contributions and individual knowledge regarding heterogeneity. The study shows that contribution behaviours are dependent on subjects' awareness of heterogeneous productivities and indicate that more information about heterogeneity produces more efficient contribution behaviours[2].

In this article, we consider the problem faced by blood banks in inducing efficient voluntary contribution behaviour among individuals with different potential abilities to donate. In light of the previously mentioned experimental studies of voluntary public goods provision among individuals with heterogeneous productivities, we conjecture that potential donors generally have an innate motivation to contribute to social efficiency and exhibit donation behaviour in response to their awareness of different abilities to contribute. To verify this

[1] A number of experimental studies have focused on alternative sources of heterogeneity, such as wealth (Buckley and Croson 2006; Chan, et. al. 1996) and marginal benefits (Palfrey and Prisbrey 1997; Bagnoli and Mckee 1991).

[2] Note that in an economic environment consisting of individuals with heterogeneous productivities, the efficient provision of public goods calls for `supermanship', in which individuals with superior ability contribute no less to the public good than those with lower ability.

conjecture empirically, we conducted a field experiment in conjunction with blood donation campaigns. Based on the experimental results, we conclude that the provision of explicit information regarding the eligible donor profile (i.e., the ability to contribute to the blood bank) tends to increase the propensity to donate in people who donated previously, whereas such information may not enhance the stated intention of potential donors.

The remainder of the article is organised as follows. Section 2 describes the institutional background, the experimental design and the procedures of the field experiment. Section 3 describes the results of the questionnaire surveys and donor characteristics. Section 4 analyses the effects of information provision on subject intention to donate blood and on actual blood donation behaviours. Section 5 concludes the article.

2 Institutional Background and Experimental Design

Donor base enlargement and greater recruitment of new donors are important for many blood donation centres. The population structure is aging rapidly in Japan, and centres increasingly depend on blood from the younger generation (Kyoto City 2009). Japan Red Cross Blood Donation Centres (JRC), located in various regions in Japan, regularly set up mobile blood donation centres at universities. Kyoto Sangyo University (KSU) is one of the universities in Kyoto city that hosts regular blood donation campaigns organised by JRC-Kyoto.

Broadly speaking, three types of blood donations exist in Japan: 1) apheresis donation, which removes only part of the blood component and returns the main volume of blood to the donor; 2) 200-ml whole-blood donation, and 3) 400-ml whole-blood donation. Compared to the other two types, 400-ml whole-blood donation establishes more stringent criteria for donor eligibility in terms of body weight (> 50 kg), frequency and the minimum interval between successive donations (maximum of three times a year with a minimum interval of 12 weeks for male donors and a maximum of two times a year with a minimum interval of 16 weeks for female donors). Clinically, the 400-ml donation is preferred over the 200 ml donation because the former is less likely to cause infections and undesirable side

effects during transfusion. JRC-Kyoto regularly administers 400 ml whole donation campaigns at KSU.

We obtained consent from JRC-Kyoto to conduct an experimental study in collaboration with Kyoto Sangyo University Student Health Care Society during the blood donation campaigns held at KSU. JRC-Kyoto has medium- and long-term targets to enlarge the donor base and attract first-time donors from among the younger population (Kyoto City, 2009). In this context, the study aims to i) identify the determinants of voluntary blood donation and ii) investigate creating awareness of different individual abilities and potentials to contribute to blood banks through information provision appeals to potential donors' motivation to donate. To identify the determinants of blood donation behaviour, we adopted the questions used in a survey on the attitudes of young blood donors conducted by the Japanese Ministry of Health, Labour and Welfare (2006). For the effect of information provision on the heterogeneous ability to contribute to blood banks, JRC-Kyoto proposed by that we examine the effect of providing explicit information about eligible donor profiles for 400-ml whole blood donations because JRC-Kyoto particularly attempts to increase this type of blood donation among young potential donors[3]. Attracting potential 400-ml whole-blood student donors with the desired profile is likely to improve efficiency at blood donation centres by reducing the waiting times and attrition rates of potential donors during the pre-donation screening at the donation centre.

Informational flyers about blood donation as a part of brief survey questionnaire (called a classroom questionnaire) were distributed prior to the blood donation campaign on 8 and 9 July 2010. A total of 1008 students attended nine lectures between 30 June and 8 July 2010 and responded to the classroom questionnaires. The questionnaires included either a Standard or Profile flyer.

The nine lectures were chosen with a consideration of the breadth of academic year levels and disciplines, including science and engineering, law, management and

[3] We initially considered investigating the effects of information about priority blood types in relation to the inventory of blood products at the local blood bank. However, the proposal to provide information about heterogeneous needs by blood type during the blood donation campaign was not supported by JRC-Kyoto. Reduced donations by non-priority blood types were feared due to a potential significant reduction in overall donations. However, after determining the generally positive effect of information provision on donor differential abilities (i.e., eligible blood donor profiles), future studies could investigate the effects of providing more refined information about deficient blood types to investigate the efficiency-enhancing effect of making individuals aware of heterogeneous abilities to contribute to public goods.

economics, English and cultural studies, as well as the availability of members of the Student Health Society to administer the classroom questionnaires. The allocation of flyer types and treatments balanced the proportions of subject orientation, student academic year level and gender between recipients and treatments and avoided counting the same students twice [4]. The number of questionnaires and the allocation of flyer types among the classrooms are summarised in Table 1.

Table 1: General Characteristics of the Recipients of Information Flyers and Classroom Questionnaires

Class ID	Subject Area	Academic Year	Flyer Type	Number of Respondents	Male Respondents (%)	Previous Donors (%)
1	Statistics	2nd	Profile	80	90.9	10.4
2	History	1st ~ 4th	Profile	81	48.7	8.6
3	Economics	1st	Profile	119	79.3	10.1
4	Economics	2nd	Standard	176	85.1	15.9
5	Economics	2nd ~3rd	Standard	136	70.7	15.4
6	English	2nd&3rd	Standard	108	31.8	15.7
7	Law	2nd ~ 4th	Profile	87	61.2	18.4
8	Law	1st	Profile	134	71.0	10.4
9	Management	1st	Profile	87	69.0	8.0
	Total			1008	68.9	13.2

The flyers and questionnaires were printed on paper of two different colours (pink paper was used for the Standard flyers, and blue paper was used for the Profile flyers) to enable subject identification anonymously by colour without explicitly indicating that an experiment had been conducted. The Standard flyer included only logistical information concerning the forthcoming blood donation campaign, such as

[4] To avoid double counting, we considered student registration patterns. For instance, History course (Class ID 2) is a general liberal arts course open to students of all academic years. According to the curriculum design of Law faculty, Law school students generally take this course in the 2nd year and above. Another method to avoid double counting is selection of classes simultaneously occurring on the same date (such as classes of IDs 4 and 5). An additional announcement was made before distributing questionnaires, and students were informed to not take the questionnaires if they had already received a questionnaire in other class.

the dates, times and locations. The Profile flyer included additional information regarding the desired donor profile for 400-ml whole-blood donation. A sample of the informational flyers and questionnaires is included in Appendix 1.

After obtaining consents from the professors in charge of the lectures, each student attending the lectures received a questionnaire with either the Standard or Profile flyer. The questionnaires and flyers were distributed either before or after the lectures. Following a brief blood donation campaign announcement by one of the researchers or a representative of the Student Health Care Society, students were asked to answer the questionnaires. The completed questionnaires were collected at the end of the lectures.

Only nine classes received either Standard or Profile flyers, which may have introduced confounding effects, such as the subject orientations of the study and student academic year level. The use of different coloured paper for the flyer types may have influenced decisions. We adopted an approach that attempted to balance the requirement that students were unaware of the different treatments (by implementing the same treatment in one class), minimise the manpower needed to administer the classroom questionnaire (choosing a few relatively large classes) and enable us to trace classroom subjects at the blood donation centre anonymously (by easily distinguishing the two treatment types by the colours of flyers)[5].

All students who came to the donation centre during the blood donation campaign on 8 and 9 July 2010 and 7 and 8 October 2010 were asked to participate in a brief survey. The blood donation campaign of October 2010 was 13 weeks after the July 2010 campaign, thus satisfying the minimum required time interval for 400-ml donation for male donors, not female donors. Most donors donate no more than three times a year, implying an interval of more than 16 weeks between consecutive donations, and the returned questionnaires during the July and October campaigns were pooled for the analyses. The questionnaires at the donation centre included a question asking whether donors had received either the pink (Standard) or blue (Profile) flyer in their classrooms.

[5] As we report in next section, many students who received the flyers in class could not recall the colour of the flyer. In a future study, we plan to include memorable but irrelevant features related to answering the questionnaire or to blood donation to identify the flyer types. These features will enable us to administer both flyers discreetly in every class and allow us to use the flyers to distinguish the donors at the donation centre.

3 Descriptive statistics

3.1 Pre-Campaign Classroom Flyers and Questionnaires

As reported in Table 1, approximately 70% of all students who received the flyers were male, which reflected the proportion of male students for the 2010-2011 academic year as reported by the university registry (71.6%). We found that 13% of the classroom subjects had previously donated blood. The questionnaires asked previous donors about their initial motivation for their first blood donation and asked new donors about their reasons for not previously donating. Tables 2 and 3 report the responses to these questions. Table 2 indicates that more than one out of five previous donors cited "to contribute to society" as a motive for donating blood for the first time. Notably, a number of previous donors either stated that their first donation was not motivated by a particular reason or indicated that they simply had spare time. Other frequently reported motives for the first blood donation included receiving rewards in kind (sweets and juice) and the fact that it was an activity organised by the university. Approximately 14% of previous donors cited recognition of the shortage of supply and suggestions from friends as one of their initial motivating factors.

Table 2: Initial Motivations to Donate Blood Reported by Previous Donors (Percentage of 133 Responses)

Motivations[6]	**Percentage**
To contribute to society.	23.3
Blood is in short supply.	14.3
To monitor my health.	9.8
I or my family may need a blood transfusion.	6.0
My family members and/or friends received blood.	3.8
To receive sweets and juice after the donation.	17.3
It is a university activity.	15.8
It was suggested by my friends.	13.5
Others	22.6

[6] Motivation items are adopted from the questionnaire used by the Japanese Ministry of Health, Labour and Welfare (2006). Some of the motivation items in the original questionnaire were rephrased for relevance to our student respondents. For instance, "It is one of the university activities" aims to capture whether blood donation campaigns, which are often organised by public services (such as police offices and self-defence forces and private firms) are considered to be activities endorsed as part of university activities.

When considering reasons for not donating blood, we note that a substantial number of students (203 of 843 respondents) reported an absence of motivation as a reason for not donating, superseding the common discomfort associated with blood donation (e.g., the cost of time, aversion to injections, fear of infection and general uneasiness).

Table 3: Reasons for not Donating Blood (Percentage of 843 Responses)

Reasons	Percentage
My blood did not meet the standard.	4.9
There was no place nearby to donate blood.	18.4
I did not know where to donate blood.	6.6
It is too time consuming.	18.6
Someone else can donate blood.	5.9
Donated blood is wasted.	1.2
I am scared of injecting a needle.	24.0
I am afraid of infection.	3.2
I am uneasy about blood donation in general.	13.3
I am not motivated to donate blood.	24.1
I cannot donate due to travel restrictions.	0.6
I am on medication.	2.0
Others	10.3

3.2 Questionnaire at the Blood Donation Venue

A survey questionnaire was handed individually to each volunteer donor at the reception of the blood donation venue during the donation campaigns on 8 and 9 July 2010 and 7 and 8 October 2010. Most respondents completed the questionnaire while waiting for the registration cards to be processed and before proceeding to the medical consultation and giving blood samples for the pre-donation screening. In total, 353 questionnaires were returned, of which 81% were from male respondents, and 46% were from first-time donors (Table 4). Table 5 reports 317 responses on the motives of students who came to donate blood during the campaigns. The most

frequently reported motive was “to contribute to society” (44%), followed by “to monitor my health” (20%).

Table 4: General Characteristics of Respondents to the Questionnaire at the Blood Donation Venue

Donation Campaign	8, 9 July 2010	7, 8 October 2010	Total
Number of Respondents	206	147	353
Male Respondents (%)	173	111	284
	(84.39)	(76.03)	(80.91)
First-time Donors (%)	107	57	164
	(51.94)	(38.78)	(46.46)
Standard Flyer Recipients	3	1	4
(%)	(4.05)	(0.73)	(1.90)
Donation Campaign	8, 9 July 2010	7, 8 October 2010	Total
Profile Flyer Recipients	3	1	4
(%)	(4.05)	(0.73)	(1.90)
Recipients of Either Flyer	11	25	36
(%)	(14.86)	(18.25)	(17.06)
Donors who did not	63	112	175
Receive Flyers	(85.14)	(81.75)	(82.94)

Note: Percentages reported exclude unknown responses. Recipients of either flyer include those who recalled the types of flyers and those who could not recall the types.

Table 5: Motivations to Donate Blood during the Donation Campaign (Percentage in Total of 317 Responses)

Motivations	Percentage
To contribute to society.	44.16
Blood is in short supply.	9.15
To monitor my health.	20.19
I or my family may need a blood transfusion.	3.47
My family members and/or friends received blood.	1.58
To receive sweets and juice after the donation.	7.57
It is a university activity.	9.15
It was suggested by my friends.	16.72
Others	12.93

4 Results

In this section, we examine the conjecture that potential blood donors have an innate motivation to contribute efficiently to society; thus, efficient donation behaviour can be induced by making individuals aware of their potential contribution (i.e., the net marginal product of their contribution). We first analyse subject intention to donate blood as identified in the classroom questionnaires, and then we examine subject actual donation behaviour, as observed at the donation venue.

Our behavioural conjecture predicts that subjects who received Profile flyers with detailed information concerning the desired donor profile tend to have a higher propensity to donate than subjects who received Standard flyers. Table 6 summarises the frequencies and distribution of the scores of subject intentions to donate blood within 12 months by the flyer types. The results of the Wilcoxon-Mann-Whitney test suggest a statistically significant difference between the underlying distribution of the intention scores of previous donors and the distribution of students without previous donation experiences; previous donors tend to report greater intention to donate than donors without previous donation experience ($z = 8.509$, $p=0.0000$).

To examine the effect of information provision on subject stated intentions while considering other potential determinants, we regressed the scores for intention against individual characteristics and a dummy variable for the Profile flyer. We constructed two types of binary dependent variables: strong and weak intentions. A strong intention with a value of one was assigned to subjects who responded either “certainly yes” or “most likely yes” to the question, “Do you intend to donate within 12 months?” A value of zero was assigned to other subjects. Similarly, a weak intention with a value of one was assigned to subjects who responded either “certainly yes”, “most likely yes” or “neither yes nor no”. A value of zero was assigned to other subjects.

Table 6: Number of Responses and Distribution of Intention to Donate

	Do you intend to donate blood within 12 months?						
Treatment	Certainly No	Most Likely No	Neither Yes Nor No	Most Likely Yes	Certainly Yes	No Answer	Total
Standard	41	160	159	29	23	8	420
(%)	(9.76)	(38.10)	(37.86)	(6.90)	(5.48)	(1.90)	
Profile	73	206	238	42	16	13	588
(%)	(12.41)	(35.03)	(40.48)	(7.14)	(2.72)	(2.21)	
Total	144	366	397	71	39	21	1008

Tables 7.1 and 7.2 report the coefficients and standard errors estimated using Probit and OLS models, respectively. The dependent variables include elements that are likely to affect the intention to donate: being male or being a member of sports club enhances the likelihood of weighing more than 50 kg and having the desired blood donor profile. Knowledge of other blood donors and recognition of the usefulness of one's own blood are included because these factors may affect the intention to donate.

As shown in column (1) of Tables 7.1 and 7.2, being female, having donated blood previously, and knowing someone who donated blood among family members or friends seem to enhance significantly the strong intention to donate blood. The additional information regarding the potential donor profile does not seem to matter. In fact, separate regressions for previous donors and non-donors (not reported here) indicate that information about the potential donor profile affects reported intention differently. The effect of information seems to interact with subject recognition of the usefulness of donation and with their membership in sports-related societies. To examine such potential differential effects of information based on previous experience of blood donation, recognition of the usefulness of one's own blood and membership in sports clubs, our estimation model reported in columns (2) includes interaction terms with a dummy variable for information treatment (one for those who received Profile flyers, and 0 for those who received Standard flyers).

Column (2) in Tables 7.1 and 7.2 indicates that the marginal effect of information among previous donors on strong intentions tends to be negative. Notably, the signs and statistical significances of the coefficients of the interaction

terms in the Probit model in Table 7.1 cannot be directly interpreted because the interaction effects introduce bias in nonlinear models (Ai and Norton 2003)[7]. However, the OLS regression reported in Table 7.2 considers the signs and significance of the coefficients; these results confirm that the coefficient of the interaction term between previous donation and information using *weak intention* as a dependent variable is significantly and unambiguously negative. Therefore, it seems reasonable to states the following:

Result 1: The baseline effect of information about the desired donor profile on subject intention to donate is not significant. As far as previous donors are concerned, the information tends to negatively affect the previous donor intention to donate.

[7] We gratefully acknowledge the comment made by one of the anonymous referees regarding this point.

Table 7.1: The Determinants of Intention to Donate (Probit Regression)

	Dependent Variable: Strong Intention [1)]		*Dependent Variable: Weak Intention* [1)]	
	(1)	(2)	(3)	(4)
Information Regarding Donor Profile	-0.077	0.006	-0.011	-0.037
	(0.124)	(0.177)	(0.090)	(0.120)
Gender (1 for Male; 0 for Female)	-0.247*	-0.261**	-0.214**	-0.229**
	(0.130)	(0.131)	(0.096)	(0.097)
Previous Donation (1 for Previous Donor; 0 for Non-Donors)	1.057***	1.233***	0.862***	1.235***
	(0.170)	(0.212)	(0.145)	(0.234)
Blood Type B	-0.175	-0.189	-0.084	-0.089
	(0.170)	(0.171)	(0.117)	(0.118)
Blood Type AB	-0.121	-0.129	-0.034	0.011
	(0.236)	(0.237)	(0.116)	(0.167)
Blood Type O	-0.141	-0.152	0.137	0.127
	(0.091)	(0.148)	(0.108)	(0.108)
Recognition of Usefulness[2)]	0.149*	0.219	0.247***	0.353**
	(0.091)	(0.140)	(0.067)	(0.106)
Knowledge of Other Donors	0.414***	0.415***	0.422***	0.427***
	(0.143)	(0.144)	(0.091)	(0.092)
Membership in Sports Club	-0.118	-0.173	0.026	-0.197
	(0.130)	(0.204)	(0.091)	(0.147)
Previous Donation × Information		-0.322		-0.640**
		(0.287)		(0.298)
Recognition of Usefulness × Information		-0.117		0.166
		(0.182)		(0.134)
Membership in Sports Club × Information		0.081		0.361
		(0.264)		(0.187)
Log Likelihood	-255.416	-254.461	-558.918	-553.718
Pseudo R^2	0.139	0.142	0.081	0.090
Observations	878	878	878	878

Table 7.2: The Determinants of Intention to Donate (OLS Regression)

	Dependent Variable: Strong Intention [1)]		*Dependent Variable: Weak Intention* [1)]	
	(1)	(2)	(3)	(4)
Information Regarding Donor	-0.014	-0.002	0.005	-0.013
Profile	(0.020)	(0.027)	(0.033)	(0.044)
Gender (1 for Male; 0 for Female)	-0.042*	-0.044**	-0.079**	-0.084**
	(0.021)	(0.022)	(0.035)	(0.035)
Previous Donation (1 for Previous	0.272***	0.324***	0.295***	0.391***
Donor; 0 for Non-Donors)	(0.030)	(0.043)	(0.048)	(0.071)
Blood Type B	-0.025	-0.027	-0.032	-0.034
	(0.026)	(0.026)	(0.043)	(0.043)
Blood Type AB	-0.013	-0.015	0.011	0.003
	(0.037)	(0.037)	(0.061)	(0.061)
Blood Type O	-0.025	-0.026	0.048	0.045
	(0.024)	(0.024)	(0.039)	(0.039)
Recognition of Usefulness[2)]	0.027*	0.041*	0.090***	0.124***
	(0.015)	(0.023)	(0.024)	(0.037)
Knowledge of Other Donors	0.054***	0.054***	0.159***	0.160***
	(0.021)	(0.021)	(0.034)	(0.034)
Membership in Sports Club	-0.019	-0.026	0.010	-0.070
	(0.020)	(0.032)	(0.033)	(0.052)
Previous Donation × Information		-0.097*		-0.178*
		(0.059)		(0.095)
Recognition of Usefulness ×		-0.022		0.056
Information		(0.029)		(0.048)
Membership in Sports Club ×		0.011		0.132*
Information		(0.041)		(0.067)
R^2	0.117	0.121	0.106	0.115
Observations	878	878	878	878

Notes: 1) Individuals who responded "certainly yes" or "most likely yes" to the question, "Do you intend to donate blood within 12 months?" had a *strong intention* to donate. Individuals who responded "neither yes nor no" in addition to "certainly yes" or "most likely yes" to the question, "Do you intend to donate blood within 12 months?" had a *weak intention* to donate.

2) The majority (51.9%) responded, "I do not know" to the question, "Do you think your blood is valuable?" Individual recognition of the usefulness of one's own blood

was scaled as follows: “I think it is valuable”=1, “I do not know”=0, “I do not think it is valuable”=-1.

How can we interpret the seemingly negative differential effect of information provision on previous donors? One possible explanation states that information on the desired donor profile makes previous donors aware of potency and eligibility and appeals to innate motivation to donate in support of social efficiency. Because previous donors may have this explicit recognition of moral expectations for donation, the overt expression of the intention to donate generates discomfort, and failing to satisfy this moral expectation results in embarrassment. To avoid such a potential loss of utility due to dissonance between actions and stated intentions, subjects may understate their intention. To consider this suggestion more closely, we now analyse the actual donation behaviours of the classroom subjects who received informational flyers.

The effect of the provision of information about the donor profile on actual blood donation behaviour can be inferred from the flyer type proportions of classroom subjects who came to donate during the donation campaigns. The survey questionnaires at the blood donation centre asked whether donors had received classroom questionnaires and the flyer colours. Of the 211 respondents to this question, 36 donors had received the classroom questionnaires. Unfortunately, Table 8 shows that only 8 of 36 recalled the colour of the flyers. Although not statistically significant, the comparison of the reported number of donors who received Standard and Profile flyers by previous donation experiences indicates that the provision of information about the desired donor profile enhances the propensity of previous donors to donate (chi-square = 2.00, p = 0.157). This observation is consistent with the earlier inference that previous donors who received information regarding the desired donor profile tended to understate their intention to donate within 12 months.

The fact that 36 of 211 respondents went to the donation centre indicates that 17.06% of the volunteer donors had received either type of informational flyer. According to the university registry, 13,066 students were registered for the academic year between April 2010 and March 2011, and 1008 students received either type of flyer. Therefore, 7.71% of all registered students received either flyer. If the flyers did not affect donation behaviour, we would expect to observe a similar proportion of donors at the donation centre who received either flyer. The observed

proportion of student subjects among blood donors was 17.06%, which was much higher than the proportion of classroom subjects in the total number of students (7.71%). These findings suggest that the provision of either the Standard or the Profile informational flyer enhanced donation behaviour.

Table 8: Number of Actual Donations among the Subjects

	Number of Observations*	Number of Respondents who Received the Standard Flyer	Number of Respondents who Received the Profile Flyer	Number of Respondents who Received Flyers but could not Recall the Flyer Type	Number of Respondents who did not Receive a Questionnaire
First-time Donors	102	3 (2.94%)	1 (0.98%)	11 (10.78%)	87 (85.29%)
Previous Donors	109	1 (0.92%)	3 (2.75%)	17 (15.60%)	88 (80.73%)
Total	211	4 (1.90%)	4 (1.90%)	28 (13.27%)	175 (82.74%)

Note:* We initially planned to ask about receipt of a questionnaire with an informational flyer in the classroom and ascertain whether it was a Standard flyer (pink) or a Profile flyer (blue) as soon as all volunteer donors arrived at the reception desk. However, the receptionists had great difficulty with consistent record keeping. Thus, during the second day of the blood donation campaign (9 July 2010), we decided to use revised questionnaires with an additional question to track the flyer types for the classroom subjects.

Fifteen first-time donors (14.7%) received either flyer, whereas 21 previous donors (19.3%) received either flyer. The results of a chi-square test indicate that there is no statistically significant relationship between previous donation experiences and whether subjects received flyers (chi-square with one degree of freedom = 0.0470, p = 0.828).

The following statement summarises the above findings:

Result 2: The provision of information concerning blood donation seems to increase the propensity to donate for both previous donors and first-time donors. Additional

information regarding the desired profile of donors appears to enhance this propensity, although the small number of responses prohibits the conclusion that previous donor propensity is statistically significant.

5 Discussion and Concluding Remarks

In this article, we consider one of the challenges faced by blood banks: encouraging efficient voluntary contribution behaviours among individuals with different abilities. In light of the growing body of experimental studies on voluntary contribution behaviour among individuals with heterogeneous marginal products, we present the following conjecture: potential donors have an innate motivation to act for social efficiency and to align donation behaviour in response to information regarding their potential contributions. To verify this conjecture empirically, we conducted a field experiment in the context of a blood donation campaign at the university with two treatments: one treatment with information about the desired donor profile for 400-ml whole-blood donation and the other without such information.

First, the results of the field experiment indicate that the provision of information about differential abilities to contribute to the blood bank seems to increase the propensity to donate among those who are eligible and more able. This finding seems to indicate “the role of giving as an expression of individual volition, as a contribution to economic efficiency, and as a determinant of social cohesion” (Arrow 1972, p.346). A second and somewhat surprising finding indicates that the provision of information regarding the heterogeneous ability to contribute has a perverse effect on potential donor intentions. In view of the apparent enhancement of actual donation behaviour due to the provision of information, a reasonable explanation of the latter adverse effect of information indicates a behavioural response to pre-empt possible inconsistencies between intention and action and to avoid embarrassment.

Considerations for future studies are in order. First, future studies should improve the experimental design to trace the actual donation behaviours of experimental subjects more effectively and randomly allocate student subjects between the informational treatments. Alternative designs are necessary to disentangle the treatment effects without confounding factors, including coding

different informational flyers with features that are memorable for students but independent and irrelevant for blood donation or providing flyers with coded tickets to be exchanged for prizes at the donation centre. The second advancement that we are exploring is collaboration with JRCs in other regions to investigate the role of information provision in soliciting efficient blood donation campaigns by season or to focus on the deficiency or rareness of blood types.

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Appendix

A Sample Questionnaire

Questionnaire survey on blood donation (July 2010)

This questionnaire aims to understand the current status of blood donation at the Kyoto Sangyo University with the objective of improving future blood donation campaigns. This is a collaborative study between the Student Health Care Society and the Kyoto Economic Experiment Laboratory.

You are asked to answer any parts of the questionnaire voluntarily. Every effort will be made to ensure the confidentiality of information provided in your answers. The data collected in the questionnaire will be used exclusively for the above-mentioned purpose.

Kyoto Economic Experiment Laboratory
Kyoto Sangyo University

Blood donation campaign

The blood donation centre aims to meet the ever-growing demand for quality blood for blood transfusions.

[Medical institutions need donors of **400 ml** of blood. For 400-ml donations, eligible people are **18** years and above and have a body weight of **50 kg** and above.][8]
As indicated below, blood donations can be made.
Date:
8 July 2010, 10:00 ~ 15:30
9 July 2010, 10:00 ~ 15:30
Venue: South side of Koyama Hall entrance

Thank you very much for your kind contribution.

Kyoto Sangyo University Student Health Care Society

Q1 Have you ever donated blood？

	yes
	no

Q2 If you answered “yes” in Q1,
When did you donate blood for the first time？

year	month

Where did you donate blood for the first time?

	University
	Outside of the university
	Do not remember
	Others:

Q3 If you answered “yes” in Q1,
What were your motives for donating blood for the first time?

[8] This information between the square brackets was included in the Profile flyer but suppressed in the Standard flyer.

	To contribute to society.
	I heard that blood is in short supply.
	To monitor my health.
	I or my family may need a blood transfusion.
	My family members and/or friends received blood.
	To receive sweets and juice after the donation.
	It was a university activity.
	I was suggested by my friends.
	Others

Q4 If you answered “yes” in Q1,

How many times have you donated blood?

times

How many times did you donate at the university?

times

Q5 If you answered “yes” in Q1,

How many times did you donate during the last 12 months?

	None
	Once
	Twice
	Three times
	Over 3 times
	Don’t know

Q6 If you answered “no” in Q1,

What are the reasons you do not donate blood?

	My blood did not meet the standard.
	There was no place nearby to donate blood.
	I did not know where to donate blood.
	It is too time consuming.
	Someone else can donate blood.
	Donated blood is wasted.
	I am scared of injecting a needle.
	I am afraid of infection.
	I feel uneasy about blood donation in general.
	I am not motivated to donate blood.
	I cannot donate due to travel restrictions.
	I am on medication.
	Others:

Q7 What is your blood type?

	Type A
	Type B
	Type AB
	Type O
	Do not know
	Rh +
	Rh —
	Do not know

Q8 Do you think your blood is valuable?

	I think so
	I do not think so
	Do not know

Q9 Is there anyone who donates blood among your family or friends?

	yes
	no

Q10 What is your gender?

	female
	male

Q11 What is your subject of study?

department	year

Q12 What type of student societies and/or sports clubs do you belong to?

	Cultural society
	Sports club
	Competitive sports club

Q13 Do you intend to donate blood within 12 months?

	Certainly no
	Most likely no
	Don’t know
	Most likely yes
	Certainly yes

Thank you very much for your participation.

In addition to the questions contained in the sample questionnaire administered in the classrooms, the following questions were asked in the questionnaire administered at the blood donation venue.

Additional question 1: What are your motives for donating blood this time?

	To contribute to society.
	Blood is in short supply.
	To monitor my health.
	I or my family may need a blood transfusion.
	My family and/or friends received blood.
	To receive sweets and juice after the donation.
	It is a university activities.
	It was suggested by my friends.
	Others

Additional question 2: Have you recently seen the questionnaire concerning blood donation in one of your lectures?

	No
	Yes. I have seen a pink questionnaire[9]
	Yes. I have seen a blue questionnaire.
	Yes. However, I do not remember the colour.

[9] The questionnaire with the Standard flyer was printed on pink paper, and the questionnaire with the Profile flyer was printed on blue paper.