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ACTIVE DECISIONS AND PROSOCIAL BEHAVIOUR: A FIELD EXPERIMENT ON BLOOD DONATION*

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Assigning a subjective value to a contribution to a public good often requires reflection. For many reasons, this reflection may be put off, reinforcing the underprovision of public goods. We hypothesise that nudging individuals to reflect on whether to contribute to a public good leads to the formation of issue-specific altruistic preferences. The hypothesis is tested in a large-scale field experiment on blood donations. We find that an 'active-decision' intervention substantially increases donations among subjects who had not previously thought about the importance of donating blood. By contrast, contributions of individuals who had previously engaged in such reflection are unchanged.

One of the biggest challenges to institutional choice is to find arrangements that overcome the free-riding problem inherent in the voluntary provision of public goods. How can people be motivated to volunteer, donate blood, or give money to charitable causes? While a significant fraction of individuals behaves prosocially (Frey, 1997; Fehr and Schmidt, 2002; Andreoni, 2007), experimental research has shown that voluntary contributions to public goods are often below the efficient level, with many individuals not contributing anything; see, e.g. the evidence compiled in Fehr and Schmidt (1999). In response, many mechanisms have been suggested to increase contributions.[1] These mechanisms explicitly or implicitly rely on the assumption that individuals have fully made up their mind about the costs and benefits of a particular activity. In other words, the preferences – in the tradition of Stigler and Becker (1977) – are assumed to be fixed.

Yet, in many cases, this assumption may not apply. Individuals may well understand the cost of contributing to a public good in terms of money, time and other factors but not be sure about the benefits the public good would yield or how they would value them. Research has shown that individuals have difficulty valuing a range of public goods (Kahneman *et al.*, 1999). Attributing a value to a particular prosocial activity

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[1] Several papers study matching donations and related mechanisms such as raffles, generally finding positive effects on prosocial engagement (Landry *et al.*, 2006; Karlan and List, 2007). Other papers examine how tapping prosocial motivations can increase monetary donations, for example, by making potential donors an up-front gift (Falk, 2007), implementing pay-as-you-want schemes (Gneezy *et al.*, 2010), evoking social comparisons (Frey and Meier, 2004; Croson and Shang, 2011), or by giving individuals the opportunity to make their contributions known (Ariely *et al.*, 2009; Carpenter and Myers, 2010). In the domain of blood donations, similar mechanisms have been explored (Goette and Stutzer, 2011; Lacetera *et al.*, forthcoming).

may require introspection. This takes time, consumes resources, and may even be unpleasant. Thus, many people may choose to stay ignorant, rather than make a decision. As a consequence, they do not engage in the prosocial activity. This opens up a new avenue to increase prosocial behaviour: we propose the hypothesis that engaging uninformed individuals in an active decision (AD) to contribute or not contribute to a public good induces them to reflect and form a subjective value for the prosocial activity. If their value is sufficiently high, they will contribute. Indeed, it is often argued that only slight nudges are sufficient to engage individuals in deliberations that substantially affect their behaviour (Thaler and Sunstein, 2008). Thus, our aim is to show why and for whom AD elicitation mechanisms work.

In this article, we test the hypothesis for the case of blood donation. Most countries rely on unpaid blood donations, which constitute an important voluntary contribution to the public good of a sufficient blood supply, to which no substitute exists in many medical procedures.[2] Importantly, becoming a blood donor falls into the category of decisions involving a costly valuation process. While people might easily conjecture its costs in terms of time and discomfort, ascribing a subjective value to donating blood needs some reflection. Many of the benefits come from saving lives in situations of dire emergencies. Imagining oneself or others in such situations may be agonising. Putting off thinking about such decisions avoids these thoughts but, as a consequence, also puts off blood donations. Indeed, correlational evidence from earlier studies (Lemmens *et al.*, 2005) and the evidence presented in this article show that individuals who have previously given little thought to blood donations are much less likely to become blood donors.

Previous evidence examining the potential of AD mechanisms is scant. Two studies examine the decision to carry an organ-donor card (Johnson and Goldstein, 2003, 2004). Whether to become an organ donor or not is a choice that involves imagining what one's preferences are in case of one's death. Many individuals may want to put off such reflection. The authors compare US states where drivers are presumed to be organ donors unless they explicitly opt out to states where drivers have to opt in. The former states have much higher fractions of willing donors than the latter. This is consistent with the hypothesis that some individuals put off thinking about the decision to become organ donors and stick with the default.[3] A third group of states uses an AD mechanism: they do not offer a default but individuals have to make an active choice about organ donation in order to obtain a driver's licence. The results show that the average fraction of individuals who choose to carry an organ-donor card is almost equal to the average in states that presume individuals' consent. Individuals may even put off the process of reflection when doing so can entail large personal costs as in the context of retirement savings decisions. Reflecting about retirement may be unpleasant, raising complicated questions about the future and evoking difficult scenarios involving illness and death but building up retirement savings over a long period of time can have large payoffs in the future. Beshears *et al.* (2008) present several event studies involving

[2] We emphasise voluntary blood donation because no accepted alternative social arrangement for activating people to donate blood seems to exist. In particular, a majority rejects the installation of a market, and markets of this type did not perform well in the past; for a discussion, see Titmuss (1972). Farrugia *et al.* (2010) provide a recent survey of this discussion.

[3] See Abadie and Gay (2006) for similar evidence on donation rates using cross-country variation in consent rules among OECD countries.

companies that changed enrolment procedures for their pension plans. The study documents higher savings rates when defaults are changed from an opt-in to an opt-out programme. In related work, Carroll *et al.* (2009) study a switch in the pension plan from one where individuals had to opt-in to one where individuals had to make a choice when they entered the firm of whether to enrol or not. The evidence shows much higher enrolment for the latter cohorts, consistent with a role of ADs in this context.

In all these studies, the AD mechanism is not randomly assigned to individuals. As a result, it is difficult to infer causality. In the case of organ donation, differences in voters' religious preferences may affect, both, the state's policy and the overall willingness to carry an organ-donor card. This potentially creates an omitted-variable bias so that the correlation between decision rules and donor cards cannot be given a causal interpretation. Similarly, the studies of retirement savings do not include a randomised control. All behavioural effects are identified from cohorts starting in different years. Possible changes in policies, that could influence enrolment, such as a general change in the way employees are informed about the retirement package, are controlled for. Indeed a fully randomised study (Bronchetti *et al.*, 2011) does not find that the randomised defaults affect savings behaviour.

The evidence presented in the current study was obtained from a field experiment we conducted as part of a blood drive of the Red Cross in the canton of Zurich, Switzerland. Participants of the experiment were invited to fill in a questionnaire and to participate in the upcoming blood drive. We randomised participants into one of three different treatments that we conjecture would stimulate reflection to a different degree: in the control condition, individuals were simply informed about the opportunity to donate in the blood drive and asked to fill in the questionnaire. Observing the proportion of individuals in the control condition who donate blood informs us about the baseline tendency of individuals to donate blood without any nudge. In the strong AD treatment, people were not only informed about the opportunity to donate blood but also asked on the last page of the survey to decide on the spot whether they were willing to donate blood and to indicate their decision on the sheet. In the third treatment, the weak AD treatment, individuals were given two options. They were also asked to indicate whether they would be willing to donate blood in the drive, and, in addition, they had the option to indicate that they did not want to decide at this moment. Our study allows us to identify who is expected to be susceptible to the AD mechanism. Our proxy for an individual's past reflection on the value of a contribution is his/her response in the survey, 'Do you feel sufficiently informed about the importance of donating blood?'

In our control treatment, consistent with earlier evidence, we find a higher level of contribution for individuals who feel sufficiently informed about the importance of donating blood. We find a strong differential effect of the strong AD treatment on the two groups of potential donors: those who already feel sufficiently informed about donating blood are not statistically significantly affected by the strong AD manipulation that asks them to make up their mind on the spot. By contrast, those who do not feel sufficiently informed have a much higher probability of donating blood in the strong AD treatment than in the control treatment. Their donation rate strongly and statistically significantly increases by 8 percentage points. Compared to our sample average

donation rate of about 8%, this is a substantial effect. We subject the result to a range of robustness checks to make sure that response differences across the two groups cannot be explained by differences in procrastination, in attitudes towards new experiences, or in conscientiousness that may be correlated with reflection on blood donation. We find no evidence that any of these factors drives our results.

Overall, our results provide support for the idea that preferences should not be treated as given; see also Bowles (1998), and the references therein and the other contributions to this Feature. In contrast to these papers, our analysis emphasises that inducements to reflect, and thus to form preferences, can change behavioural responses. Presenting a choice in ways that stimulate reflection may lead to systematically different behaviours. At a more applied level, our results suggest a potential for policy interventions in terms of a simple AD mechanism that stimulates reflection and thus contributes to the formation of issue-specific preferences. Our theoretical considerations as well as the empirical evidence also indicate that this formation effect is bounded: only those individuals who have not previously engaged in the issue-specific cognitive reflection processes are susceptible to such nudges. These results are consistent with the findings of Bronchetti *et al.* (2011). As in their case, our overall results indicate small effects on the entire population, as the group susceptible to the intervention comprises only 30% of the subjects. Thus, AD interventions may be successful but need to be targeted at the right sub-population.

The remainder of the article proceeds as follows: Section 1 discusses the empirical setup and the experimental intervention. Descriptive statistics are provided in Section 2. Section 3 discusses the main results from the experiment and performs robustness checks to it. Section 4 concludes.

1. Experimental Setup

We conducted our experimental study as part of a blood drive that the Swiss Red Cross (SRC) arranges annually at the University of Zurich. Every year, the SRC posts informational material in classrooms, listing the hours and location of the blood drive. In our case, the SRC, in collaboration with us, obtained permission to conduct a study in seven large undergraduate lectures at the University of Zurich.

The study consisted of a six-page survey, which contained demographics, questions aimed at measuring prosocial preferences, impatience and a short version of the Big-Five personality scale. The survey also contained several questions regarding blood donations. It asked the subjects whether they had previously donated blood, how they came to donate blood for the first time and whether they knew their blood type. Among those questions was our key question to measure the underlying concept of whether individuals have previously reflected on donating blood. The question reads, 'Do you feel sufficiently informed about the importance of donating blood?' and had to be answered with a 'yes' or a 'no'. If an individual answered 'yes', he or she was labelled 'aware', meaning that he or she had reflected on the issue. If the participant answered 'no', he or she was labelled 'not aware', indicating that she had not reflected on the issue before. The question avoids asking specifically about topic-related knowledge. However, individuals answering 'no' have arguably given less thought to the matter, without implying a preference in either direction.

1.1. *Treatments*

There were three experimental conditions manipulating AD-making. The three treatments differed as follows:

> *Strong AD*: For the subjects in this treatment, the last page of the questionnaire contained a sheet inviting them to donate blood. It also listed the times and places of the blood drive and, most importantly, it asked individuals to either agree or refuse to participate in the blood drive by checking a 'yes' or a 'no' box. If a subject chose to participate, he or she was asked to commit to a specific date and time for the blood donation. In addition, subjects received a separate, general information sheet listing the times and places of the blood drive. In bold letters it said, 'FOR YOU TO TAKE HOME'.
> *Weak AD*: The last sheet for this group was almost identical to that of the group with a strong AD. The only difference was that it contained an additional box, saying, 'I do not want to make a decision' (about donating blood); that is, no decision was required. Again, subjects also received the general information sheet to take home.
> *No AD*: This is our control condition. The survey in this third treatment did not contain a page asking for an explicit choice. Like everybody else, and to keep the information constant across treatments, the subjects received a sheet containing the same general information about the blood drive.

1.2. *Procedures*

To implement the treatments in a large population, we selected seven large lectures and asked the professors to concede 10 minutes of their lectures before the break. A representative of the SRC gave a brief informational presentation, while the assistants distributed the survey. There is no reason to believe that the students were aware that an experiment was being conducted.

We decided how to distribute the different treatments in the lecture rooms based on their layout plans. To ensure that students would not notice that an experiment was being conducted, we used natural 'barriers', such as aisles, to separate the sections where the different treatments were distributed. The assignment of the treatments to the various sections was random. Depending on the layout of the lecture room, it was sometimes impossible to conduct all three treatments. Therefore, treatments were randomised within lectures but not across them (see Table A1 in Stutzer *et al.* (2011) for the distribution of observations across treatments and lectures).

Special care was taken to ensure identical information conditions for all subjects. After the students had worked on the survey for about 5 minutes, the assistants distributed the additional information sheet that contained the same information (and the same invitation, word for word) to all participants. This was done to make sure that all students had the same information not only regarding the times and places of the blood drive but also regarding the normative value of the campaign. We printed the extra sheet on coloured paper to ensure that the students would notice it. Furthermore, the times and places of the blood drive were also mentioned

during the SRC representative's presentation. After 10–15 minutes, the subjects left the lecture room to take a break and handed in the questionnaires to the support staff at the exit doors.

2. Descriptive Statistics

Participation in the study was high; the response rate was well above 95%.[4] In total, 1,852 questionnaires were handed in. Four people were younger than 18 and thus not allowed to donate blood. Another 10 people did not answer the question regarding awareness of the importance of donating blood. It was possible to match all the blood donations to one of the remaining 1,838 subjects.[5]

Table 1 provides a first impression of the data. It shows the stated willingness to donate blood, the share of individuals actually donating blood in the blood drive and the answers to the question regarding awareness of the importance of donating blood. Overall, 14% of the respondents indicate a willingness to donate blood in the survey. This share is calculated based on the stated preferences of the subjects in the two AD treatments. Of the sample population, 7.6% actually donate blood. The Table shows that donations differ considerably among the various courses covered. First and second-year medical students have by far the highest propensity to donate blood, followed by biology students. It is difficult to interpret any difference in donation behaviour across courses, as they may reflect differences in preferences, work load, study schedule, etc. There are also differences in answers to the awareness question between courses. While almost 90% of the second-year medical students answer that they feel sufficiently informed about the importance of donating blood, only slightly more than half of the students in the journalism course say so.

We performed tests to check the randomisation with respect to the treatment. We ran regressions of several measures that could influence blood donations on a set of class fixed effects and indicator variables for our treatment conditions. If randomisation worked, then there should be no differences in the measures between the different treatment conditions (recall that we only randomise within a class). The measures we consider in this test are measures that previous evidence suggests may be correlated with blood donations. Specifically, we test for differences in previous donations, whether the subjects felt sufficiently informed about the importance of blood donations, differences in three psychological traits that may be related to blood donations (openness to new experiences, extroversion and conscientiousness), gender and age. Given our sample size, we should be able to detect differences among groups if the differences in the measures exceed approximately 5% of the mean.

Table 2 reports the regression coefficients for the weak AD and strong AD conditions (the control condition is the reference category) and the p-values of a joint test that the treatment conditions affect the outcome measures. As can be seen in Table 2, there is only one slight difference, in age, between the treatment conditions but even this

[4] Only a few people were observed leaving the lecture halls without handing in a questionnaire.

[5] Subjects were offered participation in a raffle if they provided their address at the end of the questionnaire. All the donors in the blood drive were asked whether they had participated in the survey study. We successfully linked to the questionnaires all of the donors who reported participating in the study.

Table 1

Descriptive Statistics

Course	% stating willingness to donate blood*	% donating†	% aware of importance of donating blood	*N*
Medical school (first year)	29.7	24.0	72.4	246
Medical school (second year)	16.8	11.0	88.9	171
Biology (first year)	20.2	8.9	70.1	157
Economics (first year)	8.6	5.2	64.4	399
Economics (second year)	4.8	2.0	74.6	354
Journalism (first year)	7.9	3.9	57.9	178
Law (first year)	8.9	3.9	64.3	333
Total	14.0	7.6	69.5	1,838

Notes. *Calculations are based on subjects in the weak AD and strong AD conditions ($N = 1{,}302$). †Calculations are based on the full sample.

Table 2

Test of Randomisation

Dependent variable	Aware of importance	Donated before	Female	Year of birth	Extroversion	Conscientiousness	Openness
Strong AD condition	0.046	−0.012	−0.000	0.358	0.082	−0.077	−0.179
	(0.028)	(0.024)	(0.029)	(0.267)	(0.153)	(0.147)	(0.122)
Weak AD condition	0.002	−0.026	−0.013	0.685	0.132	−0.294	−0.076
	(0.036)	(0.029)	(0.037)	(0.280)	(0.188)	(0.185)	(0.144)
Constant	0.672	0.230	1.503	81.795	8.996	10.555	10.986
	(0.022)	(0.019)	(0.023)	(0.207)	(0.120)	(0.115)	(0.096)
R^2	0.033	0.037	0.047	0.035	0.007	0.021	0.028
p-value that AD differs from No AD	0.115	0.676	0.910	0.041	0.774	0.242	0.297
N	1,838	1,848	1,811	1,779	1,808	1,813	1,816

Note. Robust standard errors are in parentheses.

difference is quantitatively small. None of the other measures differs by treatment, not even at the liberal significance level of 10%.[6]

Having tested that randomisation was successful, we can take a first look at the results from the experiment. Figure 1 provides a surface impression of the impact of the treatments on subjects' propensity to donate blood, separately for those who indicate that they were sufficiently informed about the importance of donating blood and those who indicate that they were not. As there are clear differences in the propensity to

[6] Yet, rather than conducting seven individual tests, it may be more appropriate to estimate all seven equations by seemingly unrelated regressions (SUR), and test jointly whether the treatment conditions have any effect on any of the equations. If the residuals across the seven equations were correlated, SUR would take this into account when calculating the standard errors. When we estimate the equations by SUR, we do find evidence of correlations in the residuals (Breusch-Pagan test of no correlation $\chi^2(21) = 407.75$, $p < 0.001$). As the resulting standard errors are virtually identical to the OLS estimates, we do not report the SUR estimates. Importantly though, a joint test of whether randomisation has failed in any of the equations does not reject the null of successful randomisation ($\chi^2(14) = 15.63$, $p = 0.33$).

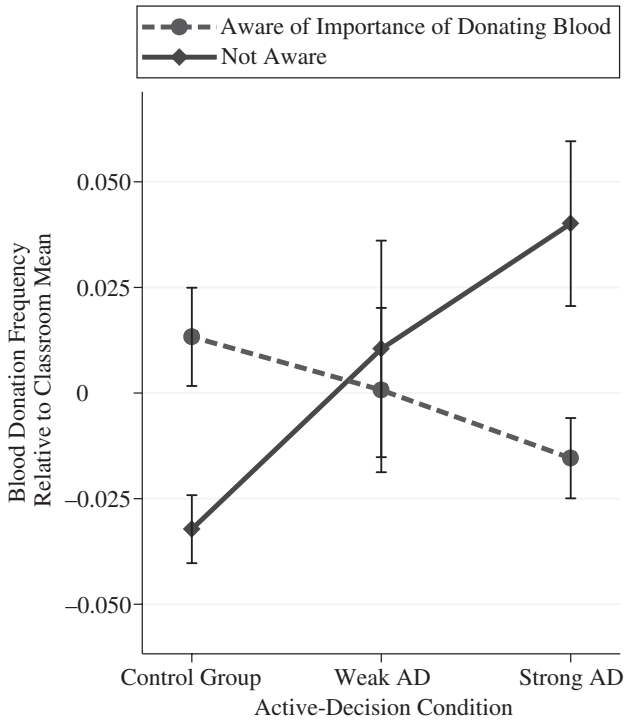

Fig. 1. *Normalised Donation Rates in the Different Treatments*
Notes. Donation rates are normalised with respect to courses because of the large differences in donation rates across them. Zero indicates an average donation rate. Positive numbers indicate by what fraction the donation rate exceeds the course average, negative numbers indicate the converse. Treatments are randomised within courses. Standard-error bars are displayed around the condition means.

donate blood across courses (as documented in Table 1) and the treatments are randomised only within lectures, we normalise the data with respect to the course mean.[7] Thus, a zero indicates that the fraction of individuals donating blood is course average. A positive number indicates a higher-than-average fraction of individuals donating blood (e.g., 0.025 indicates a 2.5 percentage points higher level than the average), and *vice versa*. For each condition mean, we also indicate its standard error with caps.

The Figure shows that the effect of the AD treatments on blood donations depends strongly on whether the subjects were aware of the importance of donating blood or not. Subjects answering 'no' to the awareness question show a clear increase in the tendency to donate blood in the strong AD treatment relative to the weak AD and the no AD treatments. Moving from the control condition to the strong AD condition, the share of donors increases by 7.2 percentage points. The standard error caps across

[7] Without normalisation, the shares of people donating blood in the groups exposed to the strong AD, weak AD and no AD treatments are 11.3%, 8.1% and 3.8%. On average, 8% of people not aware of the importance of donating blood and 7.6% of people aware donated blood. As we noted earlier, however, these numbers are difficult to interpret because our treatment is randomised only within a course and the baseline donation rates of the various courses vary strongly.

the control condition and the strong AD condition are far apart, suggesting a significant difference. By contrast, subjects who responded that they were sufficiently informed about donating blood are not more likely to participate in the blood drive if assigned to the strong AD than if assigned to the control condition. If anything, they are less likely to donate blood than in the other treatments. The share of donors is reduced by 2.9 percentage points in the strong AD treatment relative to the no AD treatment.

3. Results

To provide a formal statistical test, we estimate the impact of the experiment on blood donations using a linear probability model with robust standard errors; for a discussion, see Moffitt (1999).[8] In the regressions, the dependent variable is equal to 1 if an individual donates blood and 0 otherwise. Thus, the coefficient of any variable can be directly interpreted as the change in the share of individuals donating blood resulting from a 1-unit increase in the independent variable, holding the value of the other variables constant. Where possible, we adjust the standard errors for possible clustering on the course-treatment level (this being one reason for estimating linear probability models). As this reduces the effective degrees of freedom to the number of course-treatment clusters, we can apply this procedure only in specifications with fewer than 16 variables included.

3.1. *Blood Donations*

Tables 3 and 4 display our main results. To assess the impact of the experimental conditions on behaviour, we choose the control condition, in which subjects were not required to fill out a decision sheet, as the reference category. We first present the overall effects of the two AD conditions on blood donations. In a second step, we estimate separate treatment effects for the subjects who feel sufficiently informed about the importance of donating blood, and for the subjects who do not. Finally, we also estimate separate regressions for them so that we do not impose the same effects of the control variables on blood donations for the two groups of subjects.

Turning to the results in the first two columns of Table 3, we do not find any statistically significant differences between the three experimental conditions in how likely people are to donate blood. The point estimates on both treatments are positive, but far from statistically significant. This holds when we include a large set of controls, including past donations, personality characteristics, indicators for altruism and impatience, and controls for the social background.

However, these overall findings potentially mask significant heterogeneity in the response to the experimental conditions on individuals who had previously made up their mind about donating blood and those who had not, as our hypothesis predicts and as Figure 1 suggests. Accordingly, we estimate separate treatment effects for the

[8] None of our results depends on the details of the estimation procedure. When we estimate a probit model by maximum likelihood, the implied marginal effects are similar and all our results hold. See Tables A2 and A3 in Stutzer *et al.* (2011).

Table 3

The Effect of Active Decisions on Actual Blood Donation

	Dependent variable: donated blood (=1) Linear probability models			
	(1)	(2)	(3)	(4)
Strong AD condition	0.010	0.009		
	(0.013)	(0.013)		
	[0.013]			
Weak AD condition	0.009	0.007		
	(0.019)	(0.020)		
	[0.016]			
Aware of importance of donating blood	−0.018	−0.019	0.040***	0.035**
	(0.015)	(0.015)	(0.015)	(0.015)
	[0.019]		[0.019]	
Aware × strong AD			−0.021	−0.020
			(0.016)	(0.016)
			[0.016]	
Aware × weak AD			−0.005	−0.005
			(0.025)	(0.025)
			[0.023]	
Not aware × strong AD			0.082***	0.078***
			(0.024)	(0.024)
			[0.028]	
Not aware × weak AD			0.038	0.035
			(0.028)	(0.028)
			[0.019]	
Age, gender	Yes	Yes	Yes	Yes
Course fixed effects	Yes	Yes	Yes	Yes
Prosocial motivation†	No	Yes	No	Yes
Life goals‡	No	Yes	No	Yes
Personality§	No	Yes	No	Yes
Past behaviour‖	No	Yes	No	Yes
behaviour of relatives and friends††	No	Yes	No	Yes
R^2	0.076	0.094	0.082	0.099
N	1,688	1,688	1,688	1,688

Notes. Robust standard errors are in parentheses. Standard errors adjusted for clustering on course × treatments are in brackets. No AD is the reference category. Significance levels: $*0.05 < p < 0.1$, $**0.01 < p < 0.05$, $***p < 0.01$, two-tailed test. The control variables are defined as follows. †Prosocial motivations along 4 dimensions reported on 7-point scales. ‡Intrinsic and extrinsic life-goals along six dimensions on 7-point scales. §Ten personality characteristics each representing an opposite pole of the Big-Five personality dimensions (7-point scales). ‖Indicator of whether an individual made a blood donation in the past. ††Past blood donation behaviour of relatives and friends.

two groups: the third column of Table 3 displays the baseline results and the fourth column presents the results with the full set of controls. The estimates confirm the impression from Figure 1. Turning to column 3, we find that for participants who are unaware of the importance of donating blood, the strong AD condition substantially and statistically significantly increases the probability of donating blood compared to the control condition. Relative to the condition with no AD, a strong AD increases the probability by 8.2 percentage points. For this group, the effect of the weak AD condition on the probability of donating blood is also positive but the point estimate is smaller than for the strong AD condition. Our sample size does not allow us to estimate this effect accurately and we cannot reject that the coefficient is zero at conventional significance levels ($p = 0.17$) or statistically different from the strong AD condition

Table 4

The Effect of Active Decisions on Actual Blood Donation: Full Interactions Results

Dependent variable: donated blood (=1)Linear probability models				
	Not aware of importance of donating blood		Aware of importance of donating blood	
Strong AD condition	0.087***	0.081***	−0.024	−0.023
	(0.025)	(0.024)	(0.016)	(0.016)
Weak AD condition	0.045	0.034	−0.006	−0.005
	(0.030)	(0.031)	(0.025)	(0.025)
Age, gender	Yes	Yes	Yes	Yes
Course fixed effects	Yes	Yes	Yes	Yes
Prosocial motivation†	No	Yes	No	Yes
Life goals‡	No	Yes	No	Yes
Personality§	No	Yes	No	Yes
Past behaviour‖	No	Yes	No	Yes
behaviour of relatives and friends††	No	Yes	No	Yes
R^2	0.118	0.164	0.070	0.085
N	496	496	1,192	1,192

Notes. Robust standard errors are in parentheses. No AD is the reference category. Significance levels: *$0.05 < p < 0.1$, **$0.01 < p < 0.05$, ***$p < 0.01$, two-tailed test. The control variables are defined as follows. †Prosocial motivations along four dimensions reported on 7-point scales. ‡Intrinsic and extrinsic life-goals along 6 dimensions on 7-point scales. §Ten personality characteristics each representing an opposite pole of the Big-Five personality dimensions (7-point-scales). ‖Indicator of whether an individual made a blood donation in the past. ††Past blood donation behaviour of relatives and friends.

($p = 0.2$). None of these conclusions depends on how we calculate the standard errors (clustering on class × condition leaves the standard errors virtually unchanged) or on the inclusion of the full set of controls in column 4 of the Table. By contrast, we do not find a significant effect of any of the two AD conditions on the behaviour of individuals who already feel sufficiently informed about donating blood. As the point estimates show in column 3 of Table 3, there are no statistically significant effects of the two experimental conditions on donation behaviour. The same holds for the specification where we include the full set of controls in column 4.

The results are robust to a full interaction specification estimating separate regressions for the two groups of participants. This specification is even more flexible, as it allows the control variables to have differential effects on blood donations for the two sub-populations of 'aware' and 'unaware' subjects. The results are displayed in Table 4. The first two columns show the results for the group of participants who do not feel sufficiently informed about the importance of donating blood, in the first column with the basic control variables and with the full set of controls in the second. The strong AD intervention is estimated to increase the probability of donating blood by 8.7 and 8.1 percentage points respectively relative to the no AD condition. Even after adjusting the covariance matrix for clustering at the course-treatment level, the treatment effects are highly statistically significant. For individuals who feel aware of the issue and who have supposedly already made up their mind about donating blood, the experimental interventions again have no systematic influence on donation behaviour. People in the strong AD condition donate with a slightly lower probability, i.e. −2.4 percentage points in the third and −2.3 percentage points in the fourth column of Table 4, than in the control condition. However, these effects are not statistically significant.

Importantly, we can also establish that the two groups respond differently to the experimental interventions in all of our specifications. An F-test of the hypothesis that the coefficients on the AD treatments are the same across the two groups of individuals in Table 3 is clearly rejected ($p < 0.001$). Similarly, a χ^2-test that the estimated coefficients in columns 1 and 3 (and 2 and 4, respectively) are identical is clearly rejected ($p < 0.001$ in both cases).

Overall, our results indicate that involving people in an AD rather than offering them a simple invitation has a differential impact on the sub-population that does not feel sufficiently aware of the importance of donating blood. It increases their donation rate, while it leaves the behaviour of the others unchanged. This is consistent with our prediction that asking people to either actively consent or dissent from some prosocial behaviour stimulates reflection in those subjects who have not made up their mind about contributing to a particular prosocial activity.

We examine three alternative interpretations of our results: the first one is that the findings reflect experimentation, and that our measure for awareness is picking up a preference for finding out about the process of donating blood (How much does it hurt? Do I feel dizzy afterwards?). We argue that our treatments uncover latent prosocial preferences, and not the process of donating itself. It is, thus, important to distinguish between the two explanations. At the outset, one has to keep in mind that we already control for past blood donations in Tables 3 and 4. Hence, a higher baseline propensity to donate blood in order to 'experiment' by former non-donors is absorbed in the equation and is uncorrelated with our treatments. However, the AD treatment may have offered a form of mental commitment (see also below) and thus a better technology for learning about blood donations. This raises the possibility that people who had never donated blood before may have been encouraged to 'experiment' more in the strong AD treatment than in the weak AD and no AD treatments.

We examine this alternative explanation by exploiting the fact that there are still subjects (16%) who donated blood in the past but answer that they are not sufficiently aware of the importance of donating blood. Although this group is relatively small (70 individuals), we can examine whether this group still responds to our treatments as we hypothesised earlier. The results are displayed in Table 5, where we estimate the treatment effects for this group as the main effect, and interaction terms for the group of subjects who had never donated blood before. We find little evidence that our strong AD treatment impacts only the behaviour of subjects who had never donated blood before. Individuals who donated blood before but still do not feel sufficiently aware of the importance of blood donations, are more likely to donate blood in the strong AD condition: the point estimate is virtually unchanged relative to the baseline results in Table 4, and still statistically significant. The interaction term shows that, if anything, the strong AD condition affects donors with previous experience more strongly, although we lack the precision to make strong statements about this. However, there is clearly no evidence that the effect is weaker for donors who donated before. Column 2 in Table 5 shows that for people who state that they are aware of the importance of donating blood, there is also no response to the treatment when they have never donated blood before. This, again, lends little support to the alternative hypothesis that the AD treatment encouraged subjects to try to learn about blood donations in general. Our findings indicate that people respond to the treatment when they feel that they are

Table 5

Robustness Checks for Actual Blood Donation

Dependent variable: donated blood (=1)Linear probability models						
	Donated before		Impatience		Conscientiousness score	
	Not aware	Aware	Not Aware	Aware	Not aware	Aware
Strong AD condition	0.076***	−0.024	0.072**	−0.023	0.090**	−0.024
	(0.026)	(0.018)	(0.035)	(0.023)	(0.039)	(0.025)
Weak AD condition	0.040	−0.026	−0.010	0.014	0.043	−0.036
	(0.033)	(0.026)	(0.041)	(0.036)	(0.045)	(0.036)
Strong AD × column variable	0.024	0.004	0.014	0.000	−0.019	0.001
	(0.075)	(0.038)	(0.047)	(0.031)	(0.051)	(0.029)
Weak AD × column variable	−0.072	0.085	0.085	−0.034	−0.018	0.057
	(0.113)	(0.062)	(0.062)	(0.048)	(0.059)	(0.046)
Impatient	−0.014	−0.002	0.012	−0.008	−0.014	−0.001
	(0.025)	(0.015)	(0.021)	(0.023)	(0.025)	(0.015)
Conscientiousness score	0.002	0.001	0.001	0.001	0.003	−0.001
	(0.005)	(0.003)	(0.005)	(0.003)	(0.006)	(0.005)
Donated before	−0.030	0.012	−0.030	0.031	−0.033	0.031
	(0.023)	(0.026)	(0.044)	(0.019)	(0.044)	(0.019)
R^2	0.167	0.088	0.169	0.085	0.166	0.087
N	494	1,186	494	1,186	494	1,186

Notes. Robust standard errors are in parentheses. No AD is reference category. All specifications include control variables as in column (2) and column (4) in Table 3, respectively. Significance levels: *$0.05 < p < 0.1$, **$0.01 < p < 0.05$, ***$p < 0.01$, two-tailed test.

unaware of the importance of donating blood, rather than unfamiliar with the act of donating blood *per se*.

The second alternative explanation is that our treatment may have facilitated blood donations of individuals with a self-control problem due to present-biased preferences (O'Donoghue and Rabin, 1999). Present-biased preferences have been shown to have strong effects on behaviour in similar realms (Della Vigna and Malmendier, 2006). Offering our treatment group a mental commitment mechanism may have facilitated blood donations of individuals with present-biased preferences.[9] Due to this present bias, those same individuals may have procrastinated thinking about the importance of donating blood, thus generating an artificial correlation between our awareness variable and the treatment. To address this issue, we asked the respondents in our survey a simple question to measure impatience: would they prefer CHF 50 right now or CHF 60 (CHF denotes Swiss francs) two months from now? We use the responses to this question as a proxy for impatience. The individuals split roughly 50:50 on the two options. In the third and fourth columns of Table 5, we interact the treatment effects with impatience. If our treatments act through mitigating self-control problems, we would expect to see a larger treatment effect on individuals who report impatience in the survey. However, we find no difference between the two groups. Column 3 shows a large effect of the strong AD treatment on donations of individuals who are unaware of

[9] Evidence from psychology indicates that presenting individuals with an active choice, in which they have to consent to an activity reinforces the commitment to it (Cioffi and Garner, 1996, 1998).

the importance of blood donations and report that they are patient. There is no difference in the treatment effect for the group that reports being impatient ($p = 0.31$). Further, commitment opportunities for individuals with self-control problems are the same for individuals who feel sufficiently informed about blood donations. Yet, we find no evidence in the fourth column that impatient individuals are more likely to donate blood when exposed to a strong AD treatment. Overall, these results lend little support to the time-preferences explanation.

The third alternative explanation questions the measure of awareness as an indicator of the degree of preference formation. It might be speculated that the measure actually picks up differences in personality and, in particular, how conscientious they are (one of the Big-Five personality characteristics; see Gosling *et al.* (2003). Conscientious individuals may be more likely to have thought about the importance of donating blood and, at the same time, feel more obliged in the AD treatments to donate blood. This could potentially give rise to a spurious association between whether or not individuals state that they are sufficiently informed about the importance of donating blood and our treatment. Again, we test this alternative explanation by interacting the treatments with the conscientiousness score obtained from our survey. The traits are measured on a scale from 1 to 7, with 1 indicating the lowest, and 7 the highest degree of conscientiousness. We split the sample at the median (5.5 in this case). Columns 5 and 6 in Table 5 display the results. We find no differences in treatment effects with respect to conscientiousness in either the sample of people who report being sufficiently aware or the other sample. The point estimates on the interaction term are small in magnitude (< 2 percentage points in either case) and the p-values are nowhere near conventional levels of statistical significance. Thus, differences in conscientiousness do not explain our differential treatment effects for the aware and unaware groups.

In sum, the AD intervention does not generally increase the probability of donating blood. Rather, and in line with the differentiated hypothesis, the treatment effect depends on whether people had already formed preferences about donating blood. If people who do not feel sufficiently aware of the issue are approached, AD affects prosocial behaviour even when high immediate costs are involved.

3.2. *Stated Preferences*

Table 6 summarises the results for people's stated willingness to donate blood. We only present the results for the full interaction specification. As people in the third experimental condition did not state their preferences beforehand, it is possible to compare only the strong and weak AD conditions.

We find that the strong AD treatment has a positive effect on the expressed willingness to donate blood. The probability of stating a willingness to donate blood increases by 7.2 percentage points for people who are not aware of the issue, but this result is only borderline significant. By contrast, there is an increase of only 2.7 percentage points (not statistically significant) for people who are aware of the issue. The difference in the treatment effects between people who are unaware and those who are aware of the importance of donating blood amounts to 4.5 percentage points, however imprecisely estimated (first and third column of Table 6). It becomes somewhat more

Table 6

The Effect of Active Decisions on the Stated Willingness to Donate Blood

Dependent variable: indicated willingness to donate blood (=1) Linear probability models				
	Not aware of importance of donating blood		Aware of importance of donating blood	
Strong AD condition	0.072*	0.086*	0.027	0.033
	(0.043)	(0.044)	(0.027)	(0.027)
Age, gender	Yes	Yes	Yes	Yes
Course fixed effects	Yes	Yes	Yes	Yes
Prosocial motivation†	No	Yes	No	Yes
Life goals‡	No	Yes	No	Yes
Personality§	No	Yes	No	Yes
Past behaviour‖	No	Yes	No	Yes
behaviour of relatives and friends††	No	Yes	No	Yes
R^2	0.113	0.172	0.079	0.129
N	339	339	855	855

Notes. Robust standard errors are in parentheses. No AD is the reference category. Significance levels: $*0.05 < p < 0.1$, $**0.01 < p < 0.05$, $***p < 0.01$, two-tailed test. The control variables are defined as follows. †Prosocial motivations along four dimensions reported on 7-point scales. ‡Intrinsic and extrinsic life-goals along 6 dimensions on 7-point scales. §Ten personality characteristics each representing an opposite pole of the Big-Five personality dimensions (7-point scales). ‖Indicator of whether an individual made a blood donation in the past. ††Past blood donation behaviour of relatives and friends.

pronounced when a large set of additional control variables from the survey are included (second and fourth columns of Table 6).

In sum, we find that the implemented strong AD treatment has a significant positive effect over and above the weak AD treatment on stated preferences and on the contribution of individuals indicating relative unawareness of the topic. By contrast, no significant difference is observed for those who are aware of the issue. The results thus show an asymmetry in the effects of the experimental conditions, depending on the formation of preferences as formulated in our hypothesis.

4. Concluding Remarks

A vast literature in economics has sought to understand, and find ways to overcome, the free-rider problem with public goods. These analyses usually take it as given that individuals have a clear and stable idea of how much they value a contribution to a specific public good. Yet, in many cases, it requires reflection to form a view on this valuation and the reflection may take time, consume resources, and may even be psychologically unpleasant. Under these circumstances, another layer of a public-good problem is added, increasing the problem of underprovision even more. Many individuals may refrain from even considering a contribution because of the costs of reflection. This may render many traditional contribution-enhancing policies that, for example, reduce the costs of a prosocial activity ineffective.

In this article, we empirically demonstrate such a constellation and how an AD mechanism can overcome low contributions of specific groups. This is done for the case of donating blood: making up one's mind about the valuation of one's own blood

donation requires reflection. As blood donations are most useful in dire medical emergencies, reflecting about oneself or others being involved in such situations may be unpleasant. As a consequence, people may not engage in reflection and finally also not donate. The results from our large-scale field experiment lend support to this notion that reflection is a barrier to donating blood. In a baseline condition, we simply invite individuals to participate in a blood drive. Those who have reflected about donating blood before are more likely to donate, as our framework would predict. We also have two conditions that attempt to nudge individuals to reflect on the issue by asking them to decide on the spot whether they are willing to donate in the upcoming blood drive. Our results are consistent with the hypothesis that individuals who have not previously reflected on blood donations can be nudged to donate by this mechanism. The intervention more than doubles the propensity to donate blood in this group from about 5% to 12%. By contrast, individuals who have previously engaged in reflection are not statistically significantly affected by the intervention. In a formal statistical test, we can also show that the responses of the two groups to the mechanism are significantly different. The nudge by way of presenting a choice in an active-decision format thus works for those individuals who have not previously made up their mind.

Our findings are different from framing effects (Tversky and Kahneman, 2000; De Martino *et al.*, 2006): framing makes different aspects of a decision salient leading to changes in behaviour. They are also different from results that irrelevant cues can change subsequent behaviour (Ariely *et al.*, 2003). Otherwise, they provide an interpretation to the so-called 'mere-measurement' effects (Morwitz *et al.*, 1993) where, for example, asking people whether they intend to buy 'a car' is shown to increase their probability of actually buying one. Like an AD, the mere question may stimulate reflection on the topic among those who never considered it.

Overall, our results offer evidence for preferences being endogenous to an individual's reflection. In other words, people's preferences may change if a choice to contribute to a public good is presented in a way that is conducive to active reflection. This is complementary to the emerging view that individuals' preferences change as a function of their environment (Bowles, 1998; Goette *et al.*, 2011; Eugster *et al.*, 2011; Hoff *et al.*, 2011). In the latter perspective, changes of preferences as a function of the exogenous environment are likely to be reversible in the sense that if an environmental change is reversed, so will be preferences and thus behaviour. Our results suggest that initial reflection forms preferences permanently. Future research should further explore this aspect of preference endogeneity.

Finally, and importantly, our study also reveals the limitations of active-decision mechanisms. The results show clearly that only those individuals who are likely to have not yet constructed a preference to be a donor react to the AD mechanism, whereas others are unmoved. In that sense, such mechanisms fulfil the criteria of 'libertarian paternalism' (Thaler and Sunstein, 2008): those who know what they want are not affected by our intervention, and no choice is distorted. By contrast, individuals who have not yet made up their mind on the subject are nudged to think about it, and a sizable fraction of them chooses to contribute to the public good. Such approaches hold obvious promise for further tests in many applications. As discussed earlier, there is, for example, strongly suggestive evidence (in studies without randomised

treatments) that similar mechanisms may be successful in increasing the number of individuals carrying organ donor cards. Other applications may be endogenous preferences for environmental and cultural public goods. As many people would not face decisions about these goods in everyday life, preferences would be constructed at the time of making an AD.

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