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Gender-Based Favoritism in Blood Donations: Evidence from a Field Experiment *

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Abstract

This paper provides the first evidence of the existence of gender-based favoritism in life saving decisions to donate blood. We conduct a field experiment among blood donors from Bosnia and Herzegovina where we exogenously manipulate the signal of a blood recipient's gender by adding his/her name, and photograph, to a letter soliciting blood donation. Motivated by the literature on identity, we test the influence on donation behavior of two dimensions of shared identity between donor and recipient – gender and age. 74% more blood donors donate if the potential blood recipient is of the same gender. This result is mostly driven by male donors donating to a male recipient. In contrast to gender identity being an important determinant in fostering donors' participation rates, being of similar age to the blood recipient has relatively little effect. By identifying an important factor that influences willingness to give blood, our results have implications for better targeting of campaigns to increase blood donations.

Keywords: field experiment, blood donation, identity theory

JEL Classification: A13, C93, D91, I12, I18

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1 Introduction

Donating blood is a prime example of altruistic behavior. It directly benefits large numbers of individuals in need of transfusions by saving their lives. Therefore, ensuring sufficient supplies of this *gift of life*[1] is crucial for every country. Unfortunately, many countries still face blood shortages (Gao, 2018; Erickson, 2018), especially during periods of decreased donor availability, such as summer and early winter (Gilcher, & McCombs, 2005; McCarthy, 2007; Pitocco & Sexton, 2005; Goette, Stutzer, Yavuzcan, & Frey, 2009).

Blood donation services typically follow the World Health Organization's recommendation (WHO, 1983) to ensure a safe and sustainable blood supply based solely on voluntary non-remunerated blood donations (Misje, Bosnes, Gåsdal, & Heier, 2005; Goette & Stutzer, 2008). Thus, these services rely on the effectiveness of different donor recruitment interventions[2]. Since the non-remunerated donors' decisions to donate blood depend largely on their prosocial motivations, it is important to understand what types of interventions may encourage their participation rates, and whether these should be tailored to specific donor characteristics, such as gender or age.

In the framework of *Identity Theory* (Akerlof & Kranton, 2000), gender is one of the social categories which people belong to and identify with. It is also among the first traits we observe when we see another person (Niederle, 2014). There are numerous

[1] Blood started to be an *alienable* commodity after the developments in transfusion medicine which enabled civilians to donate blood to injured World War II soldiers. At that time, blood donation was promoted among civilians as the chance to give *the gift of life* (Charbonneau, & Smith, 2015).

[2] The most commonly used recruitment strategies are phone calls, SMS messages, letters, or blood drives in donors' neighborhoods or office spaces, and they usually differ in how the call for blood donation is framed; whether it invokes donors' altruistic motives, boosts their self-esteem, reminds them of the personal health benefits of blood donation, or similar.

studies showing that social categorization motivates in-group favoritism, defined as the tendency to favor members of one's own group over those in other groups ((Tajfel, 1969; Tajfel, Billig, Bundy, & Flament, 1971; Hogg, Turner, Nascimento-Schulze, & Spriggs, 1986; Everett, Faber, & Crockett, 2015). In-group favoritism has been tested in different contexts, including altruistic behavior. For example, employing the dictator game on tribes in Papua New Guinea, Bernhard, Fischbacher, & Fehr (2006) showed that dictators were more prone to transfer more money to recipients from their own tribe. Similarly, when the dictator game was implemented on Serbs, Croats, and Muslims in postwar Bosnia and Herzegovina, participants exercised preferential in-group treatment to people of the same ethnicity (Whitt & Wilson, 2007). Further, Chen and Li (2009) demonstrated that participants in a laboratory experiment evinced an increase in charitable concerns when matched with an in-, as opposed to an out-group member. In other words, participants were more altruistic towards an in-group match. Moreover, in Eckel & Grossman's (2001) study, when matched with another woman, women were less likely to reject the offer in an ultimatum game.

In this paper, we address the question of whether gender is deeply rooted in one's identity when it comes to prosocial behaviors, in particular when donating blood. By making the recipient's gender salient in the letter soliciting blood donation, we examine the influence of decreased social distance between donor and recipient on blood donation behavior[3]. Our main contribution is to complement the existing laboratory evidence by

[3] Our design is related to Jurajda and Janhuba (2018), who used random assignment of advisors to clients, and varied advisers' gender in one financial institution to study the effects of advisor gender on the probability of mortgage issuance. They find that male advisors issue more mortgages to arguably riskier male clients than female advisors. Similarly to Jurajda and Janhuba (2018), we use a random assignment of blood donors, while varying the gender of blood recipients; however we apply this setting to study social behavior.

testing, in an important field setting where people make decisions that can have life-saving consequences, whether gender based discrimination in altruism exists in high-stake environments.

Motivated by the literature on group identity and in-group favoritism (Akerlof & Kranton, 2000, 2005, 2010; Bernhard, Fischbacher, & Fehr, 2006; Tajfel, 1969; Tajfel, Billig, Bundy, & Flament, 1971), we exogenously manipulate the signal of a blood recipient's gender in letters soliciting blood donation. In particular, we ask our donors to come to donate blood for someone like Ruzdija (potential male recipient) or Saliha (potential female recipient)[4] in a one month period. Ruzdija and Saliha are real people who receive blood on a weekly basis and who agreed to take part in this study by allowing their name, photograph, and anamnesis to be used when framing the letter soliciting blood donation. Simply, we are interested in whether donors are more willing to come to donate blood to someone with whom they share the same gender identity. In order to additionally vary the social distance between donor and recipient, we study another category of identity – age (Ruzdija and Saliha are between 50 and 60 years old). Thus, the experiment was designed to test whether being more similar to the recipient in terms of gender and age influences donors' participation rates.

We conducted our field experiment in the summer of 2014 in partnership with the Federal Institute of Transfusion Medicine in Bosnia and Herzegovina[5]. Seven hundred and forty-six randomly chosen whole blood donors from the Institute's database were

[4] In addition to recruiting real people in need of blood to be part of our study, we ensured that no deception was used in our experiment by asking donors to donate to someone like Saliha and Ruzdija - knowing that the donor could not be sure that his/her blood would be compatible with Saliha's or Ruzdija's blood.

[5] Data collected in this experiment has already been used in another study which tested the effectiveness of reminders and frames when used in letters soliciting blood donations (Vuletić, 2015).

sent letters soliciting blood donation. We decided to sample regular donors, based on recommendations from the literature concerning the quality of the blood collected and the smaller incidence of deferrals (Costa-Font, Jofre-Bonet, and Yen, 2011; Reikvam, Svendheim, Røsvik, & Hervig, 2012). Regular donors are those who have donated blood at least once in their life. An additional benefit of sampling regular, instead of first time donors, is the ability to perform a heterogeneity analysis on the influence of our treatments, depending on the individual's donation frequency. At the same time, it is also interesting to identify whether in-group bias will be more prominent among donors who have just started donating blood, and who may need to be motivated to continue to do so, or among the more experienced donors.

Our results show that donors prefer donating to the same gender. In particular, eighty-five percent more male donors arrived to donate to the male, rather than the female recipient. The effect was strongest in the case of young male donors. For female donors, we find a qualitatively similar pattern – favoritism of female donors for a female recipient – but the effect is smaller in magnitude (51%) and not statistically significant. We further show that decreasing the social distance in terms of the donor's and recipient's age does not seem to have any significant effect.

By documenting the presence of gender-based favoritism in a real and important decision – to donate blood, our results should help in understanding who gives blood and what influences their behavior, in order to target more effective campaigns to increase blood donations. Additionaly, studying the various motivations behind blood donations can be useful for understanding a wider class of prosocial behaviors (Bruhin, Goette, Haenni, & Jiang, 2015).

This paper relates to the literature on altruism, charitable giving, and the provision of public goods (Andreoni, 1990; Bolton, & Katok, 1995). Ours is the first study to exogenously manipulate the signal of a blood recipient's gender in letters soliciting blood donation, thereby documenting that gender-based favoritism is an important motive for donors. Previous work has focused on other types of incentives to donate blood, including financial incentives (Lacetera & Macis, 2010, Lacetera, Macis, & Slonim, 2014), lottery tickets (Goette & Stutzer, 2008), a paid day off work conditioned on making a blood donation (Lacetera & Macis, 2012), and similar. There are, however, numerous blood donation services which are required by law[6] to collect donations solely from voluntary and non-remunerated blood donors. As such, these blood donation services can only use motivational nudges that are not considered to be remunerative. Non-remunerative nudges that have been shown to be effective in motivating blood donors include a reminder of the need for blood in the form of letters soliciting blood donation (Vuletic, 2015), and publication in the local newspaper of the names of repeat donors who received a medal after making a certain number of donations (Lacetera & Macis, 2008). In our study, we suggest that bringing potential blood recipients closer to the donor using their gender identities can also serve as a nudge for increasing donors' participation rates.

Our treatments are motivated by *Identity Theory* (Akerlof, & Kranton, 2000, 2010), which explains that an individual's identity can influence choices, behaviors, and economic outcomes. By dividing oneself and others into social categories, people tend to behave differently depending on which particular social category they belong to. There

[6] For example, by the Federation of Bosnia and Herzegovina's Law on Blood and Blood Components all blood collections in the Federation of Bosnia and Herzegovina should be based on 100 per cent voluntary non-remunerated blood donations (http://www.fbihvlada.gov.ba/bosanski/zakoni/2010/zakoni/8bos.htm).

are several studies that have applied identity models to explain different aspects of behavior. For example, Akerlof & Kranton (2005) argued that sharing a military identity allows lower wages to be paid in military organizations, with wages being traded off against military identity. According to the same authors, similar reasoning can be applied to any kind of work environment – if an employee identifies herself as part of the organization she works for, less monetary remuneration will be needed to perform her job well. Similarly, *Gender Identity*, defined as a personal perception of oneself as male or female (Howard, 2000), has been shown to play an important role in decision making (Akerlof & Kranton, 2010). For example, it has been shown to motivate decisions about labor force participation, allocation of work within the household, and marriage formation in the case of aversion to a wife earning more than her husband (see, e.g., Fortin, 2015; Bertrand, 2011; Bertrand, Kamenica, & Pan, 2015; Cadsby, Servátka, & Song, 2013). We build on the above-mentioned evidence by testing the importance of gender identity among blood donors, an important example of real-life altruistic behavior.

2 Empirical setup

The randomized field experiment was conducted in August and September 2014 in cooperation with the Federal Institute of Transfusion Medicine in Bosnia and Herzegovina (henceforth Institute). This health institution collects and supplies blood for use in transfusions in the Federation of Bosnia and Herzegovina. It conforms to the Federation of Bosnia and Herzegovina's Law on Blood and Blood Components, which

restricts people younger than 18 and older than 65 from donating blood and limits the frequency of blood donations to four times a year for male donors, and three times a year for female donors. The Institute collects blood from 100 per cent voluntary non-remunerated blood donations[7], and the most common manner for recruiting regular blood donors is a phone call. The person who will receive the blood is not usually identified during the recruitment phone call.

2.1 Experimental Design

The target group consisted of blood donors who had already given blood at least once at the Institute[8]. The data used in this study is a subset of data collected in a large-scale field experiment that tested the effectiveness of a reminder in the form of a letter soliciting blood donation, and the influence of frames used to invoke higher levels of empathy and altruistic motives on the willingness to donate blood (Vuletić, 2015). In this study, donors were randomly sampled into 8 groups – a control group and seven treatment groups, which received letters differing in terms of goal framing, whether a potential blood recipient was identified or not, and when identified – in the gender of a potential blood recipient.

This present study concentrates on the random sample of blood donors who received the letter soliciting blood donations that identify a potential blood recipient. This

[7] Note, there is an exception in case of emergency replacements, which are minimal. Further, according to the Federation of Bosnia and Herzegovina's Law on Blood and Blood Components, blood donors are eligible for a paid day off in exchange for donation; however most of the donors do not use this benefit (for example, their employer does not allow for that, they are students, and similar).

[8] We excluded blood donors who were not eligible to donate due to the time that has to elapse between two donations defined in the Federation of Bosnia and Herzegovina's Law on Blood and Blood Components.

sample was randomly divided into two groups - the first received a letter describing a potential female blood recipient, while the second received a letter identifying a potential male recipient. The letters and their translation from Bosnian-Serbo-Croatian to English are in the Appendix. The potential blood recipients identified in the letters, Ruzdija (male) and Saliha (female) agreed to participate in the study and to share the information about their health issues. Thus, the letter contained Ruzdija's and Saliha's names, surnames, photographs, and short stories about their health issues, revealing why they need blood on a regular basis. We ensured that Ruzdija and Saliha were as similar as possible regarding other characteristics that might influence donor decisions, such as religion (both were Muslim), nationality (Bosniaks), age (50-60), and the disease they suffer from (myelodysplastic syndrome)[9].

Importantly, the blood donors were not aware that a study was being conducted. If they had been aware that they were receiving different recruitment interventions, they might have changed their behavior (Levitt and List, 2008; List, 2008). Finally, the fact that the blood donation letters were mailed privately to the donors ensured that public image concerns were excluded from our experiment.

A few days before the beginning of each month, randomly chosen donors from two treatment groups were sent a letter with a recommended period of one month to donate blood. 824 donors were sampled, and 746 of them received the letter. The difference in the numbers is due to changes of postal address (some donors who were invited did not receive the letter) and because some donors gave blood during the month

[9] According to Ma, Does, Raza, & Mayne (2007), the distribution of the myelodysplastic syndrome is more prevalent among men in comparison to women (4.5 vs 2.7 per 100,000 people per year). However, we believe that Bosnian donors are not aware of these findings and this should not bias our results.

that the experiment was in preparation. The results are not sensitive to the exclusion of these donors.

Additional data about donors (gender, age, etc.) were collected using a simple questionnaire that is usually given prior to blood donation. Table A1. in the Appendix shows the demographic characteristics of the blood donors sampled, and Table A2. in the Appendix shows descriptive statistics.

Further checks were performed in order to verify that randomization had produced a balance of other various characteristics across experimental groups; namely balance t-tests of baseline observables (See Tables A3. and A4. in the Appendix) and an F test for joint orthogonality (Table A5. in the Appendix). The results indicate that our groups are balanced.

2.2 Empirical Strategy

Since our dependent variable of interest is a binary variable ($Arrival\_to\_Donate$)[10], we use linear probability models (LPM) to test our hypotheses. One of the main reasons we have chosen LPM models over Probit models is the latter's inconvenience when interpreting interaction effects. Further, we use standard heteroskedasticity-robust standard errors to address the potential issue of heteroskedasticity (Wooldridge, 2010). Likewise, we examine if some of the OLS fitted values are not between zero and one to address another potential shortfall of the LPM.

[10] Note, we use *Arrival to donate* when naming our dependent variable due to the fact that although not every donor will meet the criteria for donation, yet his or her willingness to give blood will be counted.

Finally, we check the robustness of the results to the model specification using a Probit model.

We test if being of the same gender as the recipient will induce more male donors to donate blood with the model below:

$$Arrival\_to\_donate_i = \alpha_0 + \alpha_1 MaleDonor_i + \alpha_2 MaleRecipient_i + \alpha_3 MaleDonor_i * MaleRecipient_i + \boldsymbol{\alpha^T X_i} + \varepsilon_i$$

$Arrival\_to\_donate$ is a binary variable which is equal to 1 if the donor arrived to donate blood, and 0 otherwise. Similarly, $MaleDonor$ is a binary variable equal to 1 if the donor's gender is male and 0 if female, while $MaleRecipient$ is equal to 1 if the potential blood recipient identified in the letter soliciting blood donation is male, and 0 for female. α_3, the coefficient in front of the interaction term is our coefficient of interest, capturing the gender-based favoritism. Further, $\boldsymbol{\alpha}$ is the vector of coefficients of the following covariates: age, the number of times a person has donated blood, dummy variables for each combination of ABO blood type and Rh status, and a dummy variable for proximity to the Institute. $\boldsymbol{X_i}$ is the vector of the covariates and ε_i is the error term.

Further, we test if being more similar to a potential recipient in terms of both gender and age will foster male donors' participation rates.

$$Arrival\_to\_Donate_i = \beta_0 + \beta_1 MaleDonor_i + \beta_2 MaleRecipient_i + \beta_3 MaleDonor_i * MaleRecipient_i + \beta_4 SimilarAge_i + \beta_5 MaleDonor_i * SimilarAge_i + \beta_6 MaleRecipient_i * SimilarAge_i + \beta_7 MaleDonor_i * MaleRecipient_i * SimilarAge_i + \boldsymbol{\beta^T X_i} + \eta_i$$

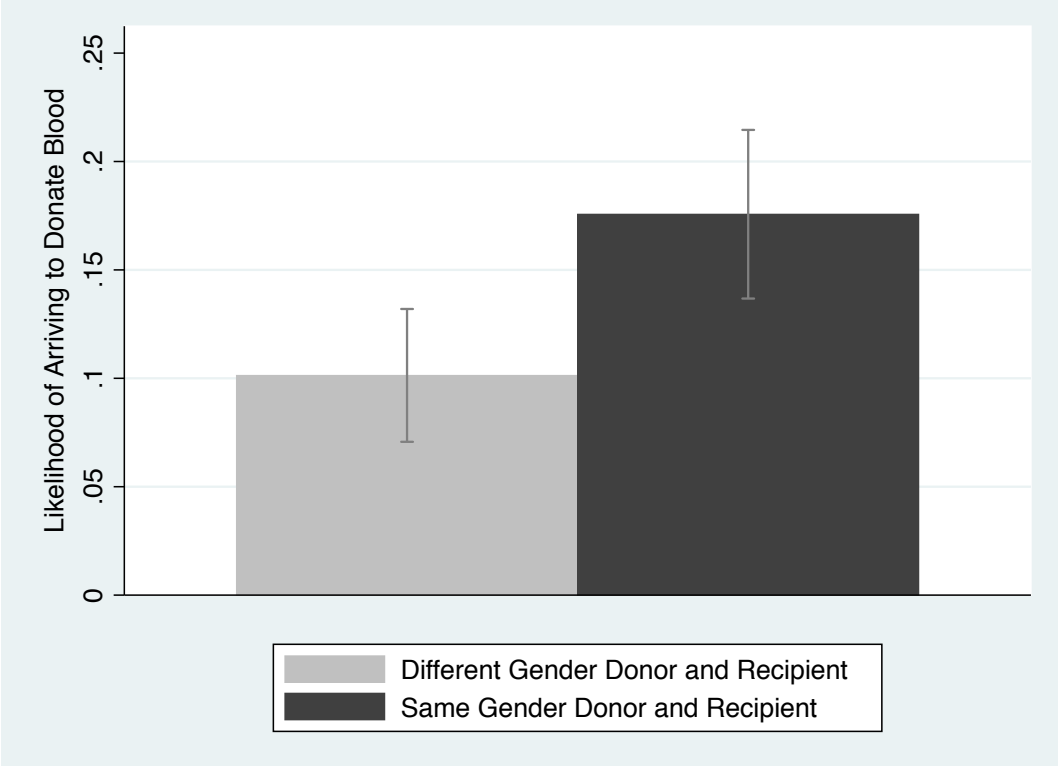
$SimilarAge$ is a binary variable equal to 1 if both donor and recipient were 50 to 60 years old, and 0 otherwise. In contrast to gender, the age of the potential blood recipient was not experimentally manipulated. Both potential recipients were between 50 and 60 years old. Since our donor pool consisted of donors older than 18 and younger than 67, we were able to match donors of a similar age to the potential blood recipient. Further, we conducted robustness checks, using different age intervals when checking the influence of decreased social distance in terms of donor and recipient age on donation behavior. Further, $\boldsymbol{\beta}$ is the vector of coefficients of the following covariates: age, the number of times a person has donated blood, dummy variables for each combination of ABO blood type and Rh status, and a dummy variable for proximity to the Institute. Lastly, η_i = error term.

3 Results

On average, the response rate for arriving to donate blood after receiving the letter soliciting blood donation mentioning either a male or female blood recipient was 14%. Further, out of the ones who arrived, 63% were the donors whose gender was matched with the recipient's gender.

74% more donors arrived to donate blood to a same-, rather than opposite-gender recipient (see Figure 1. and the first two columns in Table 1.). This relationship was statistically significant at the 1% level.

Figure 1. Gender-based favoritism



Note: Mean of donors arriving to give blood depending on whether the donor and recipient were of the same or different gender

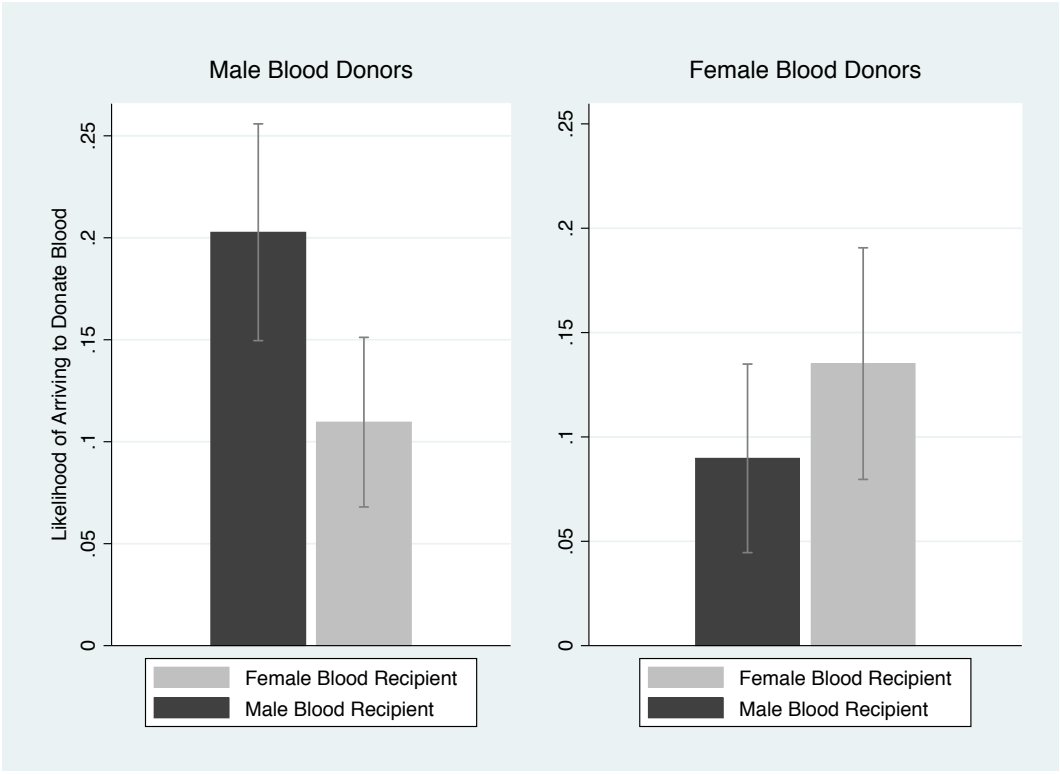
Both male and female donors preferred to donate to a recipient of the same gender; however, the difference between arriving to donate to the same in comparison to the opposite gender was significant (and larger) in the case of male donors (Figure 2., the last 3 columns in Table 1., and table A6).

Table 1. Likelihood of donor arrivals depending on the recipient's gender

	(1) Donor arrived to donate blood (=1)	(2) Donor arrived to donate blood (=1)	(3) Donor arrived to donate blood (=1)	(4) Donor arrived to donate blood (=1)	(5) Donor arrived to donate blood (=1)
Same gender donor and recipient	0.0743***	0.0788***			
	(0.0252)	(0.0249)			
Male donor			0.0450*	-0.0255	-0.0219
			(0.0251)	(0.0352)	(0.0312)
Male recipient			0.0366	-0.0454	-0.0360
			(0.0253)	(0.0363)	(0.0302)
Interaction (Male donor x Male recipient)				0.139***	0.116***
				(0.0500)	(0.0429)
Control variables [a]	Not included	Included	Not included	Not included	Included
Constant	0.101***	0.177	0.0931***	0.135***	0.199**
	(0.0156)	(0.108)	(0.0234)	(0.0282)	(0.0999)
Observations	745	745	745	745	745
R-squared	0.012	0.085	0.007	0.017	0.305

Notes: The first two columns in Table 1. show donor arrivals after being nudged with the letter soliciting blood donation mentioning a blood recipient of the same or different gender. Columns 3-5 show donor arrivals after being nudged with the letter soliciting blood donation mentioning a male blood recipient. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. [a] Control variables include: age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute; the number of times donor has donated blood before. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Figure 2. Likelihood of donors' arrival depending on the recipient's gender



The results are robust to using alternative estimators. Probit models are presented in Tables A7., A8., and A9. in the Appendix. In the subsequent paragraphs, we provide a more nuanced presentation of these results.

By adding *Male donor* (a dummy variable which is equal to 1 for male donors), and *Male recipient* (a dummy variable which is equal to 1 for male recipients) to the model (column 3 in Table 1.), we found that more male donors came to donate blood in the reporting period. Pointedly, the variable *Male donor* was significant at the 10% significance level with a positive sign. This result is not a surprise as it is usually the case that men give blood more frequently than women, due to women's medical limitations.

In particular, on average, women have lower levels of iron and lower body weight than men, making them more likely to defer (Davey, 2004; Bianco et al., 2002). Further, women experience more difficulties when their blood is withdrawn than men, such as fatigue and arm discomfort (Newman, Pichette, Pichette, & Dzaka, 2003), and they are more susceptible to vasovagal reactions[11] (Madrona, Herrera, Jiménez, Giraldo, & Campos, 2014). Moreover, pregnancy and breastfeeding restricts women from donating.

Further, when the interaction term of interest (interacting *Male donor* and *Male recipient)* was added (column 4, Table 1.), the variable *Male donor* becomes insignificant. Thus, in our case the prevalence of male donors coming to donate was mostly driven by gender-based favoritism – coming to donate to the male recipient. Similarly, Table A6. in the Appendix illustrates that about 85% more male donors arrived to donate blood when the male recipient was described in the letter. This relationship was statistically significant at the 1% level.

There are several concerns that should be addressed before continuing with the interpretation of other results. One concern is that the photograph enclosed in the letter soliciting blood donation might have signaled more than just the gender of the recipient. For example, one could argue that more male donors arrived to donate to the male blood recipient (Ruzdija) because his poor medical condition was more transparent in his photograph than that of the female blood recipient (Saliha). If that were the case, then logically more of both female and male donors should have arrived to donate to Ruzdija, which we do not see. In the third model in Table 1., a positive, yet insignificant coefficient

[11] A vasovagal reaction is sudden dizziness or loss of consciousness that can be triggered by pain, fright, or trauma.

in front of the *Male recipient* variable shows that this was not the case, as when pooling together male and female donors, we see that together they were not more prone to donate blood to Ruzdija.

Another concern is that Ruzdija's appearance indicated that he is in more need of blood than Saliha. Further, the fact that more donors did not arrive in the first week to donate to Ruzdija (Table 2.) serves as evidence that they did not perceive that Ruzdija was experiencing a greater need for blood than Saliha.[12]

Table 2. Perception of one recipient experiencing a greater need for blood than the other

	(1) Donor arrived to donate blood within the first week (=1)	(2) Donor arrived to donate blood within the first week (=1)
Male recipient	-0.00154	-0.00679
	(0.0895)	(0.0856)
Control variables[a]	Not included	Included
Constant	0.273***	0.125
	(0.0678)	(0.212)
Observations	103	103
R-squared	0.000	0.244

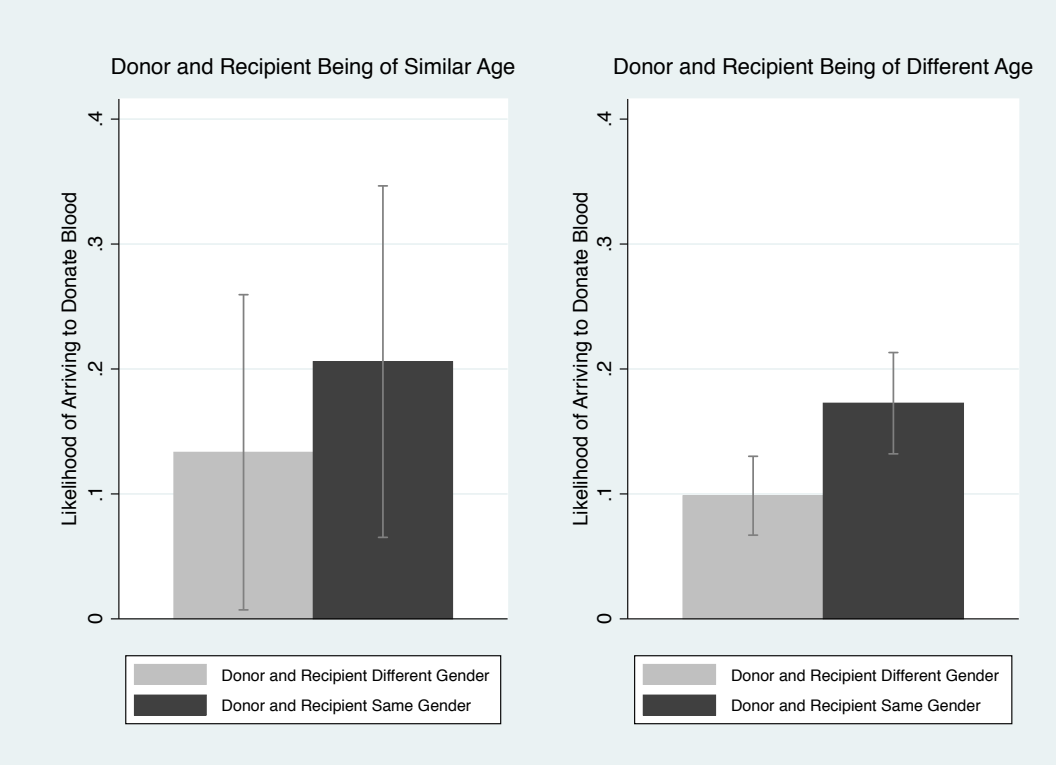
Notes: Table 2. shows the comparison of donor arrivals within the first week from receiving the letter soliciting blood donation, with the arrivals in subsequent weeks conditional on the donor coming to donate in the experimental period. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. [a] Control variables include: age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute, and the number of times the donor had donated blood before. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

[12] It is worth mentioning that it has been recently argued that receiving a transfusion from a donor who was pregnant, compared with a male donor or a female donor who was not pregnant was associated with an increased risk of death among male recipients of transfusions but not among female recipients (Cable & Edgren, 2017). However, these findings were published in 2017 and our experiment was conducted in 2014.

An easy back of the envelope calculation shows that if all, rather than only a random subsample of male donors from our sample, had received the letter soliciting blood donation mentioning a male blood recipient, 11% more donations would have been given by male donors (77 instead of 69).

In contrast to gender identity, age identity appears to have relatively little effect in increasing donors' participation rates (Figure 3. and Table 3.). In other words, being of a similar age to a potential blood recipient did not seem to have a significant effect on arriving to donate blood.

Figure 3. Likelihood of donor arrivals depending on whether or not they were in a similar age[13] group to the blood recipient



[13] Here, similar group means donors and recipients being 50 to 60 years old.

Here, it is important to mention one caveat of this result. Since the age of the potential blood recipient was not experimentally manipulated – both recipients were of similar age (50 to 60 years old), this analysis essentially represents a comparison of responses across cohorts of donors. Therefore, we advise the reader to perceive the estimates of age identity as more tentative.

Table 3. Donor arrivals depending on whether or not they were of the same gender and in a similar age group to the blood recipient

VARIABLES	(1) Donor arrived to donate blood (=1)	(2) Donor arrived to donate blood (=1)
Similar age donor and recipient	-0.0107	-0.0108
	(0.121)	(0.134)
Male donor	-0.0302	-0.0460
	(0.0364)	(0.0358)
Male recipient	-0.0467	-0.0425
	(0.0375)	(0.0360)
Male donor x Male recipient	0.140***	0.152***
	(0.0521)	(0.0509)
Male donor x Similar age donor and recipient	0.0552	0.0411
	(0.147)	(0.159)
Male recipient x Similar age donor and recipient	0.0217	0.0344
	(0.156)	(0.165)
Male donor x Male recipient x Similar age donor and recipient	-0.0344	-0.0679
	(0.197)	(0.203)
Control variables[a]	Not included	Included
Constant	0.136***	0.242**
	(0.0291)	(0.104)
Observations	745	745
R-squared	0.017	0.088

Notes: Table 3. shows donor arrivals after being nudged with the letter soliciting blood donation mentioning either a male or female blood recipient. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. [a] Control variables include: nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute, and the number of times the donor had donated blood before. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

In addition, decreasing the social distance between the donor and recipient by interacting both gender and age of the donor and recipient did not seem to have an additive effect.

Further, the probability of arriving to donate blood to the male blood recipient decreased with the male donor's age when accounting for other differences among donors (Table A10. in the Appendix).

Thus, younger male donors were the main drivers of the gender-based favoritism in blood donations (Table 4.). It might be the case that younger donors' exposure to war in Bosnia and Herzegovina (April 1992 - December 1995) which took 250 000 lives, during the sensitive phase of their social-emotional development[14] had influenced their bias to donate to someone they share the same identity with.

Table 4. Male donor arrivals depending on their age

	(1) 18-21 years old	(2) 22-34 years old	(3) older than 35
Male recipient	0.0987*	0.165**	0.0141
	(0.0534)	(0.0636)	(0.0628)
Female recipient	Reference category	Reference category	Reference category
Control variables	Not included	Not included	Not included
Constant	0.0441*	0.115***	0.167***
	(0.0251)	(0.0364)	(0.0462)
Observations	124	153	149
R-squared	0.030	0.043	0.000

Notes: Dependent variable=1 if a male donor arrived to donate blood. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

[14] The social-emotional development relates to intrapersonal and interpersonal capacities and experiences in childhood which form foundation for subsequent personal behaviors and social interactions (Stepka & Callahan, 2016).

It has been shown that prosocial motivations develop during childhood (Fehr, Bernhard, & Rockenbach, 2008; Bauer, Chytilová, & Pertold-Gebicka, 2014). Further, war can have an effect on prosocial behavior towards the same identity group (Bauer, Cassar, Chytilová, & Henrich, 2014; Bauer, Blattman, Chytilová, Henrich, Miguel, & Mitts, 2016). The 22-year-old donors were born when the war started and 34-years-old donors were 12 at that time (the 2nd column in Table 4.); thus, we can speculate that they could have internalized much of their social behavior during their wartime childhood.

As a robustness check, we used different age intervals in our analysis (see Table A11 in the Appendix). In addition to donors who experienced war during the sensitive phase of their social-emotional development, the influence of gender-based favoritism on the decision to donate was present among the youngest donors, who were 18 and 19 when this study was conducted. This may provide further evidence of in-group favoritism being pronounced in the teenage years (Fehr, Glätzle-Rützler, & Sutter, 2013).

Lastly, the presence of gender bias in blood donations was the most pronounced in the case of male donors with the lowest donation frequency – those who had donated fewer than 3 times in their life time (Table 5). We control for the age of a donor, since there is an age limit that prevents donors from donating when they are younger than 18. Thus, in comparison to older donors, someone who is younger has not had equal opportunities of time span to donate blood a similar number of times.

Table 5. Donor arrivals to donate to the same gender recipient depending on donation frequency

	Male donor			Female donor		
VARIABLES	Rare donor arrived to donate blood (=1)	Occasional donor arrived to donate blood (=1)	Frequent donor arrived to donate blood (=1)	Rare donor arrived to donate blood (=1)	Occasional donor arrived to donate blood (=1)	Frequent donor arrived to donate blood (=1)
Male recipient	0.0911**	0.0618	0.146*			
	(0.0406)	(0.0641)	(0.0752)			
Female recipient				0.0317	0.0221	0.136
				(0.0463)	(0.0629)	(0.128)
Age	-0.00121	-0.00110	-0.00619*	-0.000511	-0.00283	-0.00383
	(0.00136)	(0.00297)	(0.00325)	(0.00365)	(0.00259)	(0.00565)
Constant	0.0511	0.195*	0.407***	0.0922	0.183*	0.273
	(0.0323)	(0.0996)	(0.142)	(0.0848)	(0.0999)	(0.224)
Observations	161	157	123	166	102	36
R-squared	0.033	0.007	0.052	0.003	0.011	0.047

Notes: In our categorization, 'rare donor' represents a donor who had donated blood fewer than 3 times in his/her life time. Similarly, 'occasional donor' is a donor who had donated blood more than 3 times and less than 10 times in his/her life time. Lastly, 'frequent donor' refers to a donor who had donated blood more than 10 times in his/her life time. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

4 Conclusion

This paper establishes strong evidence of in-group favoritism based on gender. Further, it provides support for the view that gender identity plays an important role in people's decisions, including those with high stakes, such as a lifesaving decision to donate blood.

We conducted a field experiment with 746 blood donors from Bosnia and Herzegovina in which we exogenously manipulated the signal of the blood recipient's gender by disclosing the recipient's name and photograph, as well as the history of his/her disease in letters soliciting blood donation.

Seventy-four percent more donors arrived to donate if they received a letter indicating a blood recipient of the same gender. Favoritism towards the donor's own gender was more pronounced among male donors. At the same time, decreasing the social distance in terms of the donor's and recipient's age did not seem to have a significant effect.

Although it is very important to know how to motivate established donors to give blood in order to maintain a wide base of willing donors (Goette, & Stutzer, 2008), a natural open question is whether our findings can be generalized to first-time donors. Also of note is that this study was implemented in a post war country, and our results might be country specific if war strengthens narrow group identities. Thus, it would be interesting to investigate whether our results could be replicated in another country, especially in one which had not recently been exposed to a war.

In many countries which are in compliance with the WHO recommendation on how to ensure a safe and sustainable blood supply (WHO, 1983), the supply of blood is reliant solely on non-remunerated blood donors. In addition to blood donation being perishable, it is very hard to predict blood demands. Thus, transfusion services in those countries are in need of finding effective recruitment strategies and nudges that are not considered to be remuneration for blood given, yet would motivate blood donors to come to donate. We demonstrate that male and female donors behaved differently to a nudge in the form of a letter which contained a request to donate blood to a specific person. For both male and female donors, matching their gender with the potential blood recipient induced more blood donations. In identifying that gender-based favoritism has an influence on the decision to give blood, our results have implications for designing better recruitment strategies to increase blood donors' participation rates. A policy recommendation for blood donation centers would be to take into account donor group attributes when designing recruitment campaigns.

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Appendix

Examples of letters

Letter number 1: Female Blood Recipient

NEKOMU JE POMOĆ POTREBNA ODMAH

Da Salihin život pobijedi!

Poštovani darivaoče krvi,

htjeli bismo da Vas ponovo zamolimo da darujete krv.

Saliha boluje od mijelodisplastičnog sindroma (MDS) i ***živi uz pomoć dobročinstva darivalaca krvi****.*

Tokom ljetnog perioda moguće je smanjenje dostupnih doza krvi. Smanjenje nastaje uslijed manjeg broja darivalaca koji dolaze darivati krv u periodu raspusta i godišnjih odmora.

Ukoliko možete i želite da darujete krv u ljetnom periodu i pri tome ***spasite život osobama poput Salihe****, molimo Vas da dođete u Zavod za transfuzijsku medicinu Federacije BiH.*

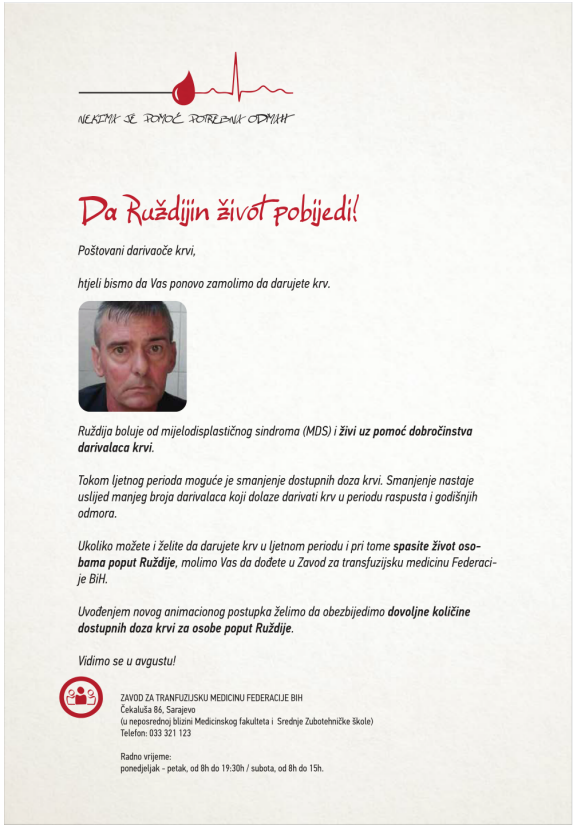
Uvođenjem novog animacionog postupka želimo da obezbijedimo ***dovoljne količine dostupnih doza krvi za osobe poput Salihe****.*

Vidimo se u avgustu!

ZAVOD ZA TRANFUZIJSKU MEDICINU FEDERACIJE BIH
Čekaluša 86, Sarajevo
(u neposrednoj blizini Medicinskog fakulteta i Srednje Zubotehničke škole)
Telefon: 033 321 123

Radno vrijeme:
ponedjeljak - petak, od 8h do 19:30h / subota, od 8h do 15h.

Letter number 2: Male Blood Recipient



NEKOMU JE POMOĆ POTREBNA ODMAH

Da Ruždijin život pobijedi!

Poštovani darivaoče krvi,

htjeli bismo da Vas ponovo zamolimo da darujete krv.

Ruždija boluje od mijelodisplastičnog sindroma (MDS) i ***živi uz pomoć dobročinstva darivalaca krvi****.*

Tokom ljetnog perioda moguće je smanjenje dostupnih doza krvi. Smanjenje nastaje uslijed manjeg broja darivalaca koji dolaze darivati krv u periodu raspusta i godišnjih odmora.

Ukoliko možete i želite da darujete krv u ljetnom periodu i pri tome ***spasite život osobama poput Ruždije****, molimo Vas da dođete u Zavod za transfuzijsku medicinu Federacije BiH.*

Uvođenjem novog animacionog postupka želimo da obezbijedimo ***dovoljne količine dostupnih doza krvi za osobe poput Ruždije****.*

Vidimo se u avgustu!

ZAVOD ZA TRANFUZIJSKU MEDICINU FEDERACIJE BIH
Čekaluša 86, Sarajevo
(u neposrednoj blizini Medicinskog fakulteta i Srednje Zubotehničke škole)
Telefon: 033 321 123

Radno vrijeme:
ponedjeljak - petak, od 8h do 19:30h / subota, od 8h do 15h.

Translation of letters from Bosnian/Croatian/Serbian to English (both letters had the same main design and logo, but different wording):

Letter number 1: Female Blood Recipient	Letter number 2: Male Blood Recipient
The title: Let Saliha's life win!	**The title:** Let Ruzdija's life win!
Dear blood donor,	Dear blood donor,
We would like to again ask you to donate blood.	We would like to again ask you to donate blood.
Saliha's photograph	Ruzdija' photograph
Saliha suffers from myelodysplastic syndrome (MDS) and **she is alive thanks to blood donors' benevolence**.	Ruzdija suffers from myelodysplastic syndrome (MDS) and **he is alive thanks to blood donors' benevolence**.
The summer period is known as a period of potential blood shortages that arise due to fewer donors donating blood during the summer holiday season.	The summer period is known as a period of potential blood shortages that arise due to fewer donors donating blood during the summer holiday season.
If you can and want to give blood in the summer period and thereby **save lives of people like Saliha**, please come to the Federal Institute of Transfusion Medicine.	If you can and want to give blood in the summer period and thereby **save lives of people like Ruzdija**, please come to the Federal Institute of Transfusion Medicine.
By implementing a new recruitment strategy, we would like **to assure sustainable blood reserves for people like Saliha.**	By implementing a new recruitment strategy, we would like **to assure sustainable blood reserves for people like Ruzdija.**
See you in August (September)!	See you in August (September)!
Federal Institute of Transfusion Medicine	Federal Institute of Transfusion Medicine

Table A1. Donors' demographic characteristics

Variable	N	Percent
Gender		
Female	341	41.38
Male	483	58.62
Age Intervals		
18-19	233	28.28
20-31	316	38.35
32-	275	33.37
Blood type and RH factor		
0 negative	44	5.34
0 positive	223	27.06
A negative	45	5.46
A positive	215	26.09
B negative	16	1.94
B positive	87	10.56
AB negative	14	1.7
AB positive	29	3.52
Missing	151	18.33
Donation Frequency		
Rare Donors (up to 3 donations)	357	43.33
Occasional Donors (3-10 donations)	292	35.44
Frequent Donors (more than 10 donations)	175	21.24

Notes: Variable age interval is constructed in a way that ensures a similar number of donors per group.

Table A2. Descriptive Statistics

VARIABLES	Mean	Standard deviation	Min	Max	N
Arrival	0.137	0.344	0	1	824
Male donor	0.586	0.493	0	1	824
Male recipient	0.511	0.500	0	1	824
Age	29.24	11.97	18	67	824
Proximity	0.723	0.448	0	1	824
NMBDonations	8.034	14.73	0	155	823

Notes: *Arrival* is a binary variable which is equal to 1 if the donor arrived to donate blood and 0 otherwise. *Male donor* is a binary variable equal to 1 if the donor's gender is male and 0 if female, while *Male recipient* is equal to 1 if the potential blood recipient from the letter soliciting blood donation is male, and 0 if female.

Table A3. Randomization check: ABO Blood Types and RH Factor

Blood types	0 negative	0 positive	A negative	A positive	B negative	B positive	AB negative	AB positive	Missing
Same gender donor and recipient	-0.0340**	-0.0413	-0.00243	0.0218	0.00485	-0.0121	0.0146	0.00728	0.0413
	(0.0156)	(0.0310)	(0.0159)	(0.0306)	(0.00962)	(0.0214)	(0.00900)	(0.0129)	(0.0269)
Different gender donor and recipient	Reference category	Reference category	Reference category	Reference category	Reference category	Reference category	Reference category	Reference category	Reference category
Constant	0.0704***	0.291***	0.0558***	0.250***	0.0170***	0.112***	0.00971**	0.0316***	0.163***
	(0.0126)	(0.0224)	(0.0113)	(0.0214)	(0.00637)	(0.0155)	(0.00484)	(0.00862)	(0.0182)
Observations	824	824	824	824	824	824	824	824	824

Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A4. Randomization check: Demographic Characteristics

Demographic Characteristics	Gender	Age	Number of Donations	Worker	Student	Missing Occupation
Same gender donor and recipient	0.0218	0.0534	-0.0292	0.0121	-0.0170	0.00485
	(0.0343)	(0.0546)	(1.027)	(0.0309)	(0.0348)	(0.0310)
Different gender donor and recipient	Reference category	Reference category	Reference category	Reference category	Reference category	Reference category
Constant	0.575***	1.024***	8.049***	0.262***	0.468***	0.269***
	(0.0244)	(0.0390)	(0.720)	(0.0217)	(0.0246)	(0.0219)
Observations	824	824	823	824	824	824

Robust standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A5. Randomization check: Test for joint orthogonality

Dependent variable=1 if the blood donor and blood recipient were of same gender

VARIABLES	Donor and recipient are of same gender (=1)
Male donor	0.0257
	(0.0366)
Age	0.0459
	(0.0351)
Number of previous donations	-0.000310
	(0.00131)
Worker	0.00940
	(0.0475)
Student	0.0142
	(0.0576)
0 negative blood type	-0.249***
	(0.0878)
0 positive blood type	-0.123**
	(0.0562)
A negative blood type	-0.0976
	(0.0877)
A positive blood type	-0.0626
	(0.0558)
B negative blood type	0.00469
	(0.132)
B positive blood type	-0.117*
	(0.0701)
AB negative blood type	0.137
	(0.141)
AB positive blood type	-0.0230
	(0.102)
Constant	0.510***
	(0.0749)
Observations	823
R-squared	0.018
F-test	1.161
Prob > F	0.304

Notes: Robust standard errors are in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Likelihood of female vs. male donor arrivals depending on recipient gender

	(1) Male donor arrived to donate blood (=1)	(2) Male donor arrived to donate blood (=1)	(3) Female donor arrived to donate blood (=1)	(4) Female donor arrived to donate blood (=1)
Male recipient	0.0931***	0.0989***	-0.0369	-0.0342
	(0.0343)	(0.0350)	(0.0306)	(0.0283)
Female recipient	Reference category	Reference category	Reference category	Reference category
Control variables	Not included	Included	Not included	Included
Constant	0.110***	0.189	0.0946***	0.0177
	(0.0212)	(0.132)	(0.0241)	(0.0559)
Observations	441	441	304	304
R-squared	0.016	0.114	0.005	0.083

Notes: Table A6. shows female versus male donor arrivals after being nudged with the letter soliciting blood donation mentioning either a male or female blood recipient. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. [a] Control variables include: age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute; the number of times donor has donated blood before. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table A7. Marginal effects from probit estimates (main effects)

Gender-based favoritism

	(1) Donor arrived to donate blood (=1)	(2) Donor arrived to donate blood (=1)
Donor and recipient being the same gender	0.0744***	0.0794***
	(0.0253)	(0.0241)
Control variables [a]	Not included	Included
Observations	745	745

Notes: Table A7. shows donor arrivals after being nudged with the letter soliciting blood donation mentioning the blood recipient of the same or different gender. Robust standard errors are reported in parentheses. [a] Control variables include: gender; age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute; the number of times the donor has donated blood before. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A8. Marginal effects from probit estimates (main effects)

Likelihood of male vs. female donor arrivals to donate to the male blood recipient

	(1) Male donor arrived to donate blood (=1)	(2) Female donor arrived to donate blood (=1)
Male recipient	0.0933***	-0.0453
	(0.0344)	(0.0363)
Female recipient	Reference category	Reference category
Control variables [a]	Not included	Not included
Observations	441	304

Notes: The first column in Table A8. shows male donor arrivals after being nudged with the letter soliciting blood donation mentioning a male blood recipient. The second column shows female donor arrivals after being nudged with the letter soliciting blood donation mentioning a male blood recipient. Robust standard errors are reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A9. Marginal effects from probit estimates (main effects)

Likelihood of donor arrivals depending on recipient gender

	(1) Donor arrived to donate blood (=1)	(2) Donor arrived to donate blood (=1)	(3) Donor arrived to donate blood (=1)
Male donor	0.0445*	-0.0273	-0.0448
	(0.0261)	(0.0371)	(0.0356)
Male recipient	0.0350	-0.0519	-0.0441
	(0.0252)	(0.0414)	(0.0393)
Interaction (Male donor x Male recipient)		0.138***	0.143***
		(0.0522)	(0.0497)
Control variables[a]	Not included	Included	Included
Observations	745	745	745

Notes: Table A9. shows donor arrivals after being nudged with the letter soliciting blood donation mentioning either a male or female blood recipient. Robust standard errors are reported in parentheses. [a] Control variables include: gender; age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute; the number of times the donor has donated blood before. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A10. Male blood donors' arrival depending on their age

	(1) Donor arrived to donate blood (=1)	(2) Donor arrived to donate blood (=1)	(3) Donor arrived to donate blood (=1)
Male recipient	0.0907***	0.196**	0.240***
	(0.0347)	(0.0879)	(0.0881)
Age	0.00127	0.00305*	0.00317*
	(0.00136)	(0.00182)	(0.00184)
Interaction (Male recipient x Age)		-0.00339	-0.00450*
		(0.00270)	(0.00270)
Control variables	Not included	Not included	Included
Constant	0.0711*	0.0172	0.110
	(0.0428)	(0.0532)	(0.137)
Observations	441	441	441
R-squared	0.018	0.022	0.120

Notes: The estimates are from the linear probability models. Robust standard errors in parentheses. [a] control variables: age; nine dummy variables for each combination of ABO blood type and Rh factor, and for missing data; dummy variable for proximity to the Institute; average number of donations. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A11. Male donor arrivals depending on their age – using different age intervals

VARIABLES	(1) 18 and 19 years old	(2) 20-24 years old	(3) 25-31 years old	(4) 32-41 years old	(5) 42- years old
Male recipient	0.108**	0.0864	0.188**	0.0738	0.0148
	(0.0528)	(0.0957)	(0.0829)	(0.0807)	(0.0783)
Female recipient	Reference category	Reference category	Reference category	Reference category	Reference category
Constant	0.0192	0.171***	0.0870**	0.118**	0.174***
	(0.0192)	(0.0596)	(0.0420)	(0.0560)	(0.0565)
Control variables	Not included	Not included	Not included	Not included	Not included
Observations	99	76	86	81	99
R-squared	0.045	0.011	0.061	0.010	0.000

Notes: Dependent variable=1 if the male donor arrived to donate blood. The estimates are from the linear probability models. Robust standard errors are reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Abstrakt

Tento článek předkládá první důkaz existence genderově založeného zvýhodňování při dárcovství krve v situacích, kdy je v sázce lidský život. Provádíme terénní experiment s dárci krve z Bosny a Hercegoviny. Při experimentu exogenně manipulujeme se signalizací pohlaví příjemce krve přidáním jeho/jejího jména a fotografie k dopisu s žádostí o darování krve. Motivování publikacemi o identitě testujeme vliv sdílené identity mezi dárcem a příjemcem na chování dárců ve dvou charakteristikách – pohlaví a věk. O 74 % více dárců daruje krev, pokud je potenciální příjemce stejného pohlaví. Tento výsledek je převážně dán mužskými dárci, kteří darují krev příjemcům mužského pohlaví. V kontrastu ke genderové identitě zjišťujeme, že věk podobný příjemci krve má relativně malý vliv. Identifikací důležitých faktorů, které ovlivňují ochotu darovat krev, mají naše výsledky implikace pro lepší cílení kampaní, které mají za úkol zvýšit dárcovství krve.

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